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ABSTRACT

The problems of underrepresentation of women and minorities in science and engineering occupations are complex and variant. Many institutions have to learn how to attract more women and minority students to the hard sciences and technologies which are still relatively non-traditional areas for both groups. The project described in this document provided the participants with direct access to experts and information in these areas so that some of the successful retention techniques used at other institutions could be adapted within their own institution. Two separate full-day workshops, one on recruitment and the other on retention, were conducted for professional registrants from 15 regional colleges. Each event included morning sessions which featured a keynote address of national scope followed by a panel of experts. Summaries of the presentations are included in this report. The remaining time was devoted mainly to small group sessions with the presenters; this allowed for fruitful exchange with the speakers as well as the participants. Take-home kits of resources materials were separately assembled for each workshop and distributed to the registrants. A list of projects and programs at home colleges as reported by participants is included. Evaluation summaries of each workshop are provided. (Author/CW)

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STAFF DEVELOPMENT TO IMPROVE RECRUITMENT & RETENTION OF WOMEN & MINORITIES IN ASSOCIATE DEGREE SCIENCE & ENGINEERING TECHNOLOGY PROGRAMS

FINAL REPORT

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FINAL REPORT

Prepared by
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Center for Advanced Study in Education
The Graduate School and University Center
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October 1989
CASE #07-89

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ABSTRACT

Two separate full-day conference/workshops, one on recruitment and the other on retention, were conducted for professional registrants from 15 regional colleges. Each event included morning sessions which featured a keynote address of national scope followed by a panel of local experts. Summaries of the presentations are included in this report. The remaining time was devoted mainly to small groups sessions with the presenters which allowed for fruitful exchange with the speakers as well as between participants. Take-home kits of resource materials were separately assembled for each conference/workshop and distributed to the registrants. A list of projects and programs at home colleges as reported by participants is included. Evaluations of each conference/workshop were predominately positive.

ACKNOWLEDGEMENTS

Dr. Bert Flugman, Principal Investigator, and Dr. Stan Brodsky, Project Director, acknowledge with gratitude the essential support and cooperation received from a number of people which helped to make this project a positive contribution to the solution of difficult educational problems.

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Melanie Bentley managed the financial affairs for the project including acquisition and organization of materials while Eileen Connelly handled the correspondence, duplicating and reportage.

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SCIENCE & ENGINEERING TECHNOLOGY PROGRAMS

BACKGROUND & PROJECT NEED

National Indications of Need

Demographic projections by the U.S. Department of Labor describing the United States labor force in the year 2000 and beyond clearly show that we will grow slowly, becoming older, more female and more minority (1). The Bureau of the Census projects that the U.S. minority population will become the numerical majority sometime during the middle of the next century and minority college age youth will reach 40 percent of that total age group by the year 2025 (2).

The labor force growth between 1986 and 2000 will increase at the low rate of 18% in 14 years, adding 21 million workers, two-thirds of whom will be women. While the proportion of whites declines from 88% to 84%, Black workers will increase from 10% to 12% of the work force. Large increases will occur among Hispanic and Asian workers with their proportions increasing from 7% and 1%, respectively, in 1986 to 12% and 4% in the year 2000. The Bureau of Labor Statistics predicts that of the broadest occupational groupings, technicians and service occupations will grow the fastest. The Bureau also notes that workers in occupations with large percentages of college trained personnel will tend to be fast-growing, higher paid and less likely to be unemployed (3).

Blacks, Hispanics and women are underrepresented in science and engineering occupations relative to their proportions in the population. Thus, while Blacks and Hispanics represent 12% and 7% of the U.S. population, they accounted for only 2.5% and 2.0% of those

employed in science and engineering positions in 1986. Similarly, only 1 in 4 science employees and 1 in 25 engineers were women in 1986 (4).

The number and percentage of Black and Hispanic high school graduates has increased between 1976 and 1985 by 8.1% and 7.3% to 75.6% and 62.9%, respectively, while white high school graduates increased by only 1.2% to 83.6%. However, while white college attendance has held roughly steady at from 33 to 34% during this period, minority college attendance has declined from 33.5% for Blacks in 1976 to 26.1% in 1985 and from 35.8% for Hispanics in 1976 to 26.9% in 1985 (5). The few highly selective colleges and universities have recently reported increased applications from minority candidates for admission and there was a sizable increase in the number of minority high school graduates taking SAT examinations this academic year. Many Black males do not apply to colleges but increasingly enter the military services; enlistments are up from 288,600 in 1976 to 356,500 in 1987. They also tend to go to proprietary schools and to jobs, although the unemployment rate of 34% for Black teenagers is three times that for white males (6).

A variety of reasons why Hispanics continue to lag behind other minority groups in entering the mainstream of higher education were given in a recent article in The New York Times (7). Among the most important are language barriers since many Hispanic students grow up in homes where English is not spoken and Hispanics generally have been slower that most immigrant groups to move away from their native language, although there is agreement among Hispanic-Americans that higher education should be sought in English. Also, traditionally strong family ties tend to discourage Hispanic youth from venturing

into the unfamiliar world of higher education. These tendencies are often reinforced by early schooling in ill-funded and overcrowded classrooms as well as lack of encouragement from teachers and counselors. Henry Cisneros, Mayor of San Antonio, was quoted as citing additional reasons for the lower participation in higher education by Hispanics. He stated that, "Hispanics are predominantly poor. They come from rural areas where there is no tradition of higher education and their social patterns and mores are a disincentive. Fathers are very protective of their daughters and don't want them to leave home. Males are supposed to go to work to help the family or into the military." Furthermore, there are no counterparts for Hispanics to the historically Black colleges which have turned out much of the Black leadership. Flora Mancuso Edwards, former President of Hostos Community College, stated that of all groups, Hispanic youth are least likely to graduate from high school and of all undergraduate college students, Hispanics are most likely to dropout (8).

A recent report noted that the concerns of the business community for a skilled work force have never been greater than in the 1980's. Employers have consistently identified the need for workers with stronger basic skills to accomplish tasks in the workplace of today and to adapt to the workplace of tomorrow. Jobs require greater reading, writing and mathematics skills and the introduction of more complex equipment will demand even higher levels of skills. William B. Johnston of the U.S. Department of Labor estimated that between now and 2000, the majority of new jobs will require at least a year of college. Current jobs require a median of 12.8 years of education and by 2000 that figure will grow to 13.5 years of education (9).

A recent study focused on the broad repercussions of eliminating millions of well-paying jobs in manufacturing, transportation and agriculture which were once available to men and women without higher education. It concluded that 20 million young people who are not likely to attend college face much more difficult lives than their counterparts in the past because of fundamental changes in the economy. Non-college youth comprises about half of the 16 to 24 year old population. It noted that in 1985, only 44% of men aged 20 to 24 earned enough to support a family of three above the poverty line, compared to 60% in the corresponding group in 1973. In 1986, male high school graduates earned 28% less, in constant dollars, if they had no college work than a similar group in 1973 and Black male high school graduates earned 44% less. Only 36% of the 1986 male high school graduates found stable, full-time jobs compared to 57% in 1968. The report concluded that these rapid changes in employability and earning power may produce a nation divided along education lines in the future (10).

Employment patterns clearly vary by ethnicity. Sex does not appear to affect those job classifications included in Table 1, although there are others, such as clerical, which are predominantly female, and craft and repair which are predominantly male occupations. It is obvious from this table that Black men and women fall more heavily into lower income occupations than their white counterparts. A recent report in The New York Times provided the data from which Table 1 is adapted. In Table 1, the high income jobs include executive, managerial, professional, technical, and sales occupations. Low income jobs include operatives, assemblers, helpers, cleaners, laborers, and a variety of other service workers.

TABLE 1

PERCENT EMPLOYMENT BY INCOME/EDUCATION CATEGORY, ETHNICITY & SEX

	Male		Female	
Employment Category	Black	White	Black	White
High Income, Higher Education	20.0%	40.7%	28.5%	41.5%
Low Income, Lesser Education	40.9%	21.8%	41.0%	24.3%

In recognition of this need, a new project initiated by the Carnegie Corporation and MIT to improve educational opportunities for minorities will plan to produce these results by the year 2000:

- o Double the number of minorities taking college preparatory courses in high school
- o Triple the number of minorities who graduate college
- o Quadruple the number of minorities receiving bachelor degrees in mathematics, science and engineering
- o Quintuple the number of minorities teaching
- o Triple the number of minorities with doctorates in mathematics, science and engineering (12).

Local Indications of Need

The Engineering Manpower Commission of the American Association of Engineering Societies conducts annual surveys among which are studies of enrollments and degrees in associate degree engineering technology and engineering science programs. Two recent reports, one of Fall 1986 enrollments (13) and the other of 1985-1986 degrees (14), have been used in the following discussion.

Of the 171 institutions responding to the enrollment survey, 137 also provided valid data for the degree survey. By assuming that the

data from the 137 institutions represent a steady state condition, one can estimate the proportion of students who are still enrolled full-time in the second year (15,347) and the overall retention rate by comparing the number of degrees (11,893) with the first year full-time enrollment (23,864). Accordingly, approximately 64 percent make it to the second year and about 50 percent receive degrees.

Corresponding data for five New York City metropolitan area public institutions which responded to both surveys show that 43 percent reach the second year and 31 percent receive degrees. Thus, these five institutions, which enrolled 3,020 full-time first year engineering technology and engineering science students, retained a significantly smaller proportion of all students than are retained in these programs nationally. In the five local colleges, only 24 percent of the women students earned degrees while the retention rate for both Black and Hispanic students was 23 percent. Evidently, these retention rates leave much room for improvement. The urgency of improving these rates for Blacks and Hispanics in urban colleges is emphasized by their significantly higher proportions in these colleges (31% and 17%, respectively) compared to the national proportions (13% and 6%). It is clear from the foregoing information that improving retention of women and minorities in engineering technology and engineering science programs in local colleges is an important priority.

Recruitment efforts are also needed to increase the proportion of women attracted to these programs. First year full-time enrollments show that about 14 percent are women, both nationally and locally. Special attention needs to be paid to early pre-college programs as well as to high school groups to reduce the underrepresentation of

women in these programs and the occupations which stem from them. Although Blacks and Hispanics attend most local urban institutions in greater proportions than are found nationally, recruitment efforts need to be focused on ensuring adequate preparation for engineering-related studies in critical subjects, such as mathematics. Here again, pre-college programs and guidance will be important. In addition, accurate information needs to be disseminated to high school and junior high school students and their parents about careers which are associated with these programs.

The national data for the percentage of high school completers reflects a serious situation for the country. However, the data for the New York City metropolitan area are even more devastating. The New York City Board of Education recently reported that 55 percent of those entering city high schools in 1982 did not graduate in 1986. Even allowing for the small proportion who may return for a high school credential, a very large number are without diplomas and these are disproportionately poor and minority (15).

SAT scores achieved by New York City students show the differences by Blacks and Hispanics compared to all others. No Black or Puerto Rican student scored 750 or higher in math, and only 1% of each group scored 650 or higher. On the verbal portion of the test, only 2 Blacks scored 750 or higher and fewer than 1% of both groups reached 650 or higher. Three times as many of these minority groups scored under 300 in verbal, and four times as many scored under 300 in math compared to other students (16).

In an analysis of the regional economy by the Port Authority of NY & NJ, the long term outlook for the regional labor market was characterized as follows (17).

"The labor market is now adjusting to declining numbers of young people entering the work force; even if the rate of job growth slows significantly from the pace of the last ten years, the number of jobs being created will grow at a faster rate than the working age population. Regardless of the rate of job growth, the demands of the job market now require higher levels of education, literacy and computational abilities, and strong communication and problem-solving skills. Simultaneously, this job market will be increasingly relying on minorities, immigrants and women, groups that have historically been limited in their employment opportunities by low education and skills levels, limited child care and transportation options, and restricted occupational mobility."

"The increase in education and skill requirements is the result of a combination of long-term trends which appear to be intensifying: the transformation of the economy from goods-producing industries to service-producing industries, the application of new office and production technologies, and the pressures of international competition and deregulation in some sectors. While these forces are eliminating many lower-skilled production and clerical jobs, they are increasing the demand for managerial, professional, and skilled technical occupations."

"...Future job growth will occur in occupations requiring the highest education levels. Between 1990 and 1995, jobs in the region are forecast to grow by 205,000, a more moderate level than during the mid 1980's, but still faster than labor force growth. White-collar jobs will continue to replace blue-collar jobs, a trend that became dominant in the 1970's. As in the 1980's, manager and professional jobs will grow rapidly, by 195,000, capturing a larger

share of all jobs."

"...The region's economic prosperity could be threatened by the inability of employers to find enough qualified workers: employers find urban education and training systems inadequate to the task of preparing the resident labor force for even entry-level jobs; immigrants with low education levels and poor English language skills continue to comprise a substantial and increasing portion of the region's labor force; and the scarcity and high cost of housing increasingly constrain the region's ability to attract skilled labor from elsewhere in the nation. The need to upgrade the region's labor force to meet the demand for skilled, well-educated workers has now become imperative, which suggests that intensified labor force development strategies will be among the most critical challenges for the remainder of the century."

The Variety of Needs

From the foregoing discussion and data, it is apparent that the problems of underrepresentation of women and minorities in science and engineering occupations are complex and variant. Many institutions have to learn how to attract more women and minority students to the "hard" sciences and technologies, which are still relatively non-traditional areas for both groups. Those institutions with large minority student enrollments need to do a better job of retaining students who have the potential to complete these demanding programs as well as accurately counseling parents and students in advance of registration. Colleges which attract substantial numbers of women to science and engineering technology programs need to be sensitive to the special concerns of women students. Techniques for

both recruitment and retention have been developed which have been shown to improve enrollments and completion rates. This project provided the participants with direct access to experts and information in these areas so that some of these techniques could be adapted to their home institutions.

PROJECT OBJECTIVES

General Objectives

This project was designed to meet the following general objectives.

1. To bring and interpret to the participants recent research findings, demographic trends and successful experiences applicable to recruitment and retention of women and minorities in science and engineering technology associate degree programs.

2. To encourage participants to exchange information about their experiences regarding recruitment and retention of women and minorities in such programs for the purpose of identifying additional innovative problem-solving approaches.

3. To provide participants with encouragement and incentives to share materials and ideas with others at their home institutions and to develop or enhance activities related to these conferences/workshops.

Specific Objectives

Within the framework of the general objectives, the following specific objectives helped define the project scope and orientation.

1. To enroll a full complement of 30 participants in each of two conferences/workshops.

2. To have each participant learn about a variety of techniques which they believe could be useful in improving either recruitment or retention of women and minorities if initiated at the home institution.

3. To support the participants in their initiation or enhancement of projects at their home institutions related to either

of these conferences/workshops.

4. To provide the participants with access to the project experts and project staff via telephone, electronic mail or other methods to help the participants overcome difficulties with their projects.

OVERVIEW OF THE PROJECT

There were three major phases of this project; pre-conference phase, operation of conferences/workshops, and the follow-up phase.

In the first phase, in addition to detailed decision-making, advertising and securing facilities, the principal speakers and panelists were identified, appointed and oriented. These experts participated in preparing several kinds of documentation for the conferences/workshops. Basic factual information regarding enrollments, employment and demographic data were assembled and edited for review and distribution. In addition, the experts were responsible for developing certain specific workshop materials based on research and their own experiences dealing with such areas as: psychological and experiential factors which inhibit enrollment by women, Blacks and Hispanics in, and increase the likelihood of withdrawal from, such programs; anticipation and early identification of problems; concrete problem-solving approaches to recruitment and retention; and innovative techniques to improve recruitment and retention of women and minorities.

Phase two involved bringing the experts and the participants together in conferences and workshops. One conference/workshop focused on recruitment and the other on retention. Mornings were devoted to formal presentations and panels while afternoons provided

for small group workshops with the experts. The materials developed in advance provided the participants with a basis for exploring problem-solving approaches which might be suitable for their home institutions. Interaction between participants was intentionally included as part of the workshops. The workshop sessions included encouraging the participants to develop a related project for their home institutions.

The third phase of the project was a follow-up program whereby participants had access to project personnel. Reports of related activities at home institutions were elicited by project personnel.

ADVISORY COMMITTEE

An Advisory Committee of knowledgeable persons in the fields of recruitment and retention of women and minorities from education, government agencies and professional organizations was assembled to advise the Project Director. Members of the Advisory Committee were:

Dr. Eleanor Baum, Dean of Engineering, Cooper Union

Ismael Diaz, Director, Field Service Programs, National Action Council for Minorities in Engineering

Ronald W. Holloway, Dean, Division of Engineering Technology, New York City Technical College of CUNY

Carole Morning, P.E., Member and Former Chairperson of the New York State Board for Professional Engineering and Land Surveying

Angelo B. Proto, University Dean for Student Services, CUNY

Dr. David Reyes-Guerra, Executive Director, Accreditation Board for Engineering and Technology

PRE-CONFERENCE ACTIVITIES

There were a variety of necessary preparatory activities which were completed in advance of the conferences/workshops. The first major decision was selection and reliably securing sites and facilities for the conferences/workshops. Suitable space was identified at the City University Graduate School and University Center in midtown Manhattan, which is readily accessible by subway, bus and railroad.

Simultaneous with the establishment of the location for these activities, the operational dates for the conferences/workshops were chosen with a view to avoid conflict with other conferences, workshops and short courses which target community college professionals might attend.

Preliminary Activities for the Recruitment Conference/Workshop

It was decided to schedule the first conference/workshop for Friday, January 6, 1989 which appeared to have little chance of conflict and college personnel were likely to be available since most would be in intersession periods.

Once the date and site were established, the keynote speaker, moderator and panelists were secured for the first event and assembling relevant materials for the participants was begun. A brochure announcing the January conference/workshop on "Recruitment of Women & Minorities in Science & Engineering Technology Associate Degree Programs" was designed, printed and disseminated to 18 local colleges*. Information was channeled through the Office of Academic

* Representatives were invited from selected senior colleges which either offer or articulate with two-year college associate degree programs in science and engineering technology.

Affairs and through professionals known to have an interest in the topic. Initial telephone calls were placed the Deans, Division and Department Chairs and others to inform them of the conference/workshop, to ask them to agree to encourage appropriate professionals to attend and to forward brochures to them. Approximately 275 copies of the brochure were mailed.

Subsequently, logistical details were resolved including audio/visual needs, movement of groups between rooms, registration processes, recording techniques, preparation of participant take-home materials, acquisition of workshop supplies, development of participant evaluation forms, development of detailed schedules, and security.

A total of 33 individuals pre-registered for the recruitment conference/workshop by mailing in a tear-off form on the brochure. Each of these individuals received an acknowledgement letter.

Preliminary Activities for the Retention Conference/Workshop

The second conference/workshop was scheduled for Friday, March 3, 1989 which, while during the spring semester, was the day of the week when fewest classes meet in many local colleges. Preliminary activities for the March conference/workshop were similar to those for the January event and were initiated in December 1988 so that a tentative agenda and list of speakers was available for distribution at the January conference/workshop. In late January, approximately 350 brochures were disseminated through similar channels as previously used. A total of 29 individuals pre-registered for the March conference/workshop.

Conference/Workshop on Recruitment

The full-day conference/workshop on recruitment was organized with morning presentations by a keynote speaker and a panel of experts followed by an afternoon of mostly small group sessions with the presenters.

After opening remarks by Dr. Bert Flugman, Director of CASE, Dr. Stan Brodsky, Project Director, introduced Dr. Cheryl B. Leggon of the National Research Council who gave the keynote address. Her topic was "Demographic Trends in the Science, Engineering and Technology Labor Force: Projections, Predictions and Implications." Summaries of the presentations by the keynoter and panelists are given in Appendix A.

Next, Dr. Lloyd M. Cooke, consultant and former President of the National Action Council for Minorities in Engineering (NACME), moderated a panel of four presenters from local institutions. Professor Carolyn A. Fazzolari, Department Chairperson of Mechanical Engineering Technology at the College of Staten Island, and Dr. Marianne B. Carlin of the same department jointly presented a paper entitled "Designing Programs for Recruiting Women into Engineering and Technology." Deborah Hairston, Coordinator of Recruitment at Fiorello H. LaGuardia Community College, followed describing "Three Innovative Approaches to Minority Recruitment." The final panelist was Robert M. Jefferson, Associate University Dean and Director of Student Affairs at CUNY, who spoke on the topic "Women & Minorities in Science & Technologies: How Do We Stack Up?" Dr. Cooke's presentation entitled "Recruitment Plus What?" ended the morning activities. Brief question/answer periods were included after each

presentation.

A working lunch period was organized into small group sessions with individual presenters hosting separate tables. When the total group reconvened, three formal small groups were established with two presenters at each circular array of chairs. Participants were permitted to select their own group within the planned capacities. Presenters were advised to expect discussion dealing with aspects of their talks but were also to encourage the group members to share experiences with each other on related topics. A plan to have the groups shift to other presenters was discarded because all groups wanted more time to continue their current discussions.

A summary session for the entire group was finally convened. Dr. Brodsky discussed the plan for follow-up activities and distributed a form requesting specific projects and plans. An evaluation form was distributed and completed. Kits of additional take-home materials were distributed to the participants.

Attendance at the recruitment conference/workshop was sharply curtailed by a snow storm which prevented 19 of the pre-registrants from coming. However, several new registrants appeared so that there were a total of 19 participants. Fortunately, all six of the main speakers attended in spite of the weather.

Kits of take-home materials from the conference/workshop were sent to the pre-registrants who were unable to attend. Thus, a total of 38 people received a significant set of materials related to the topic. One or more representatives of 14 local colleges received these materials. A listing of the additional take-home materials for the recruitment conference/workshop is shown in Appendix B.

A list of pre-registrants and attendees is given in Appendix C.

Copies of the brochure and an updated program for the recruitment conference/workshop are given in Appendix D.

Conference/Workshop on Retention

The conference/workshop on retention followed a format similar to the recruitment event.

Once again, Dr. Bert Flugman opened the days activities and Dr. Stan Brodsky introduced Dr. Reginald Wilson of the Office of Minority Concerns, American Council on Education whose keynote address was entitled "Key Elements in Successful Retention Programs." Summaries of the presentations by the keynoter and panelists in the retention conference/workshop are given in Appendix E.

Dr. Lloyd M. Cooke, consultant and former President of NACME, was once again the panel moderator. The first panelist was Dr. Elsa Nunez-Wormack, Associate Dean of Academic Affairs for the Freshman Program at the College of Staten Island who spoke on "Retaining Students & Maintaining Standards." Next was Prof. Sonja L. Jackson, Executive Director for Retention Services at the New York City Technical College. Her topic was "The Chilly Classroom Climate: Its Effect on the Learning & Retention of Women & Minorities in the Sciences." The team of Dr. Diane H. Call, Director of the College Discovery Program at Queensborough Community College, and Dr. James J. Hennessy, Professor in the Graduate School of Education at Fordham University, jointly presented information and research findings which related to "Headstart To College: An Intensive Pre-Collegiate Summer Program as a Retention Strategy." Finally Dr. Cooke spoke on "Highlights of the Last 18 Years on Retention of Minorities in Engineering." Audience questions were taken after each presentation.

A workshop lunch period consisted of small groups sessions with separate tables hosted by each presenter. When the group reconvened, a videotape produced by the Department of Human Relations at Michigan State University entitled "Minorities in the College Classroom" was shown and discussed.

Next, three small groups were established with two presenters at each circle of chairs. These lively discussions had to be interrupted to convene the summary and evaluation session.

A representative of each small group gave a brief summary of their discussion. Plans for follow-up and access to project staff were discussed by Dr. Brodsky. An evaluation form was distributed and completed. Kits of additional take-home materials relating to the topic were distributed to the participants.

Twenty-five people representing seven local colleges attended the retention conference/workshop. Materials kits were also sent to the eight pre-registrants who were unable to attend, making a total of 33 recipients of the kits. A listing of the additional take-home materials for the retention conference/workshop is shown in Appendix F. For the two conferences/workshops, an overall total of . kits of materials relating to one of the topics were disseminated.

A list of pre-registrants and attendees for the retention activity is given in Appendix G.

Copies of the preliminary program and the brochure for the retention conference/workshop are shown in Appendix H.

FOLLOW-UP ACTIVITIES

Post-conference activities were initiated after the second conference/workshop. Several individual requests for direct contact with one or another of the expert presenters or f source material

cr further information were satisfied. Since relatively few of the participants asked for assistance, the Project Director reached out to representative participants at all of the community colleges with attendees. As a result of these communications a partial listing of programs, projects and activities which relate to recruitment and or retention at these institutions was developed. This listing with brief descriptions is given in Appendix I.

EVALUATION

An open-ended evaluation form was distributed at the end of the recruitment conference/workshop and 20 responses were returned. This form asked for frank comments and critique of four segments of the program; keynote address, panel presentations, small group sessions and overall evaluation. Of the 20 responses regarding the overall evaluation of the recruitment conference, 16 were entirely positive, 2 had mixed positive and negative comments, and 2 were negative. All of the comments to each of the four sections of this opinionnaire together with a copy of the form are given in Appendix J.

While the results of the evaluation of the recruitment event were gratifying, the Project Director was advised to develop an evaluation instrument for the retention conference/workshop which would be more readily quantifiable. The revised instrument was divided into 7 sections, one of which had four items. Nine of the 10 answers were to be selected from choices of "excellent", "good", "adequate", or "poor". One item which asked whether the respondent planned to initiate a project or enhance an existing effort as a result of this conference/workshop offered answer choices of "yes", "no", and "uncertain at the moment". Space for open-ended comments was provided for all items. The form was distributed at the end of the

retention conference/workshop and 26 responses were returned. Overwhelming numbers of responses on the nine questions with four choices were either "excellent" or "good" with the preponderance in the "excellent" category in most cases. Of the 21 responses to the "yes", "no", "uncertain" question, 8 answered "yes", none selected "no", and 13 chose "uncertain". The written comments were mainly positive but there were a scattering of mixed and negative ones. A copy of the evaluation form and a summary of the results are given in Appendix J.

A general review of the project experience and outcomes concluded that the main objectives had been achieved, that the project attracted a well-informed group of participants from a representative range of institutions which are concerned about recruitment and retention of women and minorities in science and engineering technology programs, and that some new initiatives or enhanced existing activities resulted from these conferences/workshops. Project staff were disappointed that more of the pre-registrants were inhibited from attending due to weather and other conflicts. A further conclusion was that workshops on these topics conducted on individual college campuses would be useful in that they could focus on local issues, needs or sub-groups of professionals and departments.

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10. The Forgotten Half: Non-College Youth in America, Youth and America's Future: The William T. Grant Foundation Commission on Work, Family and Citizenship, Washington, D.C., January 1988, pp. 19-28.

11. "20 Years After The Kerner Report: Three Societies, All Separate," The New York Times, February 29, 1988, p. B8.

12. "New Project Hopes to Boost Minority Participation in Education," Educational Daily, Capital Publications, Inc., Alexandria, Va., February 4, 1988, pp. 5-6.

13. Engineering & Technology Enrollments Fall 1986, Part II Technology, Engineering Manpower Commission of the American Association of Engineering Societies, Inc., Washington, D.C., 1988.

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15. "The Costs of Cutting an Education Short," The New York Times, December 13, 1987, Section 4, p. 26.

16. "SAT Scores: An Analysis Proves Alarming," The New York Times, April 7, 1988, p. B1.

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APPENDIX A

PRESENTATION SUMMARIES -- RECRUITMENT CONFERENCE*

"Demographic Trends in the Science, Engineering and Technology Labor Force: Projections, Predictions and Implications"
by Dr. Cheryl B. Leggon

"Designing Programs for Recruiting Women Into Engineering and Technology"
by Prof. Carolyn A. Fazzolari and Dr. Marianne B. Carlin

"Three Innovative Approaches to Minority Recruitment"
by Deborah Hairston

"Women and Minorities in Science and Technologies: How Do We Stack Up?"
by Dean Robert M. Jefferson

"Recruitment Plus What?"
by Dr. Lloyd M. Cooke

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* These summaries of presentations were prepared by the Project Staff of CASE/IRDOE. We take full responsibility for the representation of the remarks by the speakers.

DEMOGRAPHIC TRENDS IN THE SCIENCE, ENGINEERING AND TECHNOLOGY LABOR FORCE: PROJECTIONS, PREDICTIONS AND IMPLICATIONS

Dr. Cheryl B. Leggon
National Research Council

Dr. Leggon began her talk with a brief review of some of the data which project a serious shortage of scientists, engineers and technicians by the year 2000. She explained that the specific dimensions or magnitude of the problem can not be predicted with any acceptable degree of accuracy; the projections vary, and some projections are more extreme than others. However, it is clear that, if present trends continue, in the next 10 to 15 years there will be a shortage in scientific, engineering and technical personnel of such a magnitude as to seriously threaten the United States' ability to remain viable and competitive internationally.

The key data and projections cited by Leggon in this regard may be grouped in two areas, the first relating to demand for personnel and the second relating to supply.

Demand - Between 1986 and the year 2000, the demand for scientists, technicians, and engineers is expected to increase on average by about 36%, with the greatest growth in demand being among scientists, followed by technicians and engineers. This follows a period, 1976 to 1986, when the numbers of scientists, engineers and technicians grew more rapidly than other aspects of the U.S. economy, such as total employment and Gross National Product. During those years employed scientists and engineers as a percent of total U.S. employment almost doubled.

The data suggest that the greatest growth will be at the entry level, particularly in high skill occupations, and mostly in the service sectors. Although these entry level jobs may not require a dramatic increase in skill, they do increase the importance of basic skills--reading, writing, communication and reasoning. If present trends continue, there will be a great shortage of people with the requisite basic skills, as well as a shortage of people with technical, scientific or engineering training.

Supply - The population of 18 to 24 year olds, the traditional group from which college students have been recruited, is projected to decline by 23% between 1980 and 1995. (However, it is expected to begin to bounce back around the year 2000.)

These data point sharply to the question of how the projected increase in demand for scientists, engineers and technicians can be met with the projected decreasing cohort of traditional sources of recruits.

Traditional Sources -
Leggon first discussed the need to tap a greater percentage of the traditional 18 to 24 year old group from which new scientists,

engineers and technicians have traditionally been drawn. The percentage of college age students choosing majors in science, engineering or technical fields is currently at an all-time low of 6.8%. Raising this figure by one percentage point could, by itself, perhaps meet most or even all of the projected demand in those fields. Another traditional source which could be tapped is the large existing group of people who have already been trained in those fields but are not workiing in them. Less than two thirds of the science and engineering baccalaureates in recent years have actually become a part of the science and engineering workforce.

Non-Traditional Sources -

Although greater numbers from these traditional groups could potentially be tapped to narrow the gap, Leggon argued that the problem cannot be resolved without tapping a large potential pool of workers from several non-traditional groups. These are: part-time students, "older" students (those 25 and older at first entry into college), women, and underrepresented racial and ethnic minorities.

Part-time students -- Leggon cited data showing dramatic increases in the rate of part-time college enrollment. For example, part-time enrollment increased at a rate of almost four times that of full-time enrollment between 1972 and 1982. However, the structure of most colleges, for example in terms of course scheduling and how curriculum is set up, is designed for full-time students who have no work or family responsibilities. This, Leggon said, may help explain differences in field choices between full-time and part-time students and also between "older" and traditional college age students, between women and men and between non-minority and minority students.

"Older" Students -- In the past ten years the rate of increase in college enrollment for the 25 to 34 year old cohort has grown three times faster than that for the 18 to 24 year old cohort. The size of this 25 to 34 year old cohort is not expected to decline within the next 15 years. If this group chooses careers in science, technology and engineering even at the same low rate (6.8%) as their younger counterparts, it is statistically possible that these people could fill the gap.

Women -- From 1972 to 1982 the percent increase in college enrollment for women was four times greater than that for men. However, women have entered the scientific, technical and engineering fields at rates much below their percentages in the student population and the workforce. Although women are about 50% of the U.S. population and now about 40% of the U.S. labor force, they are only 13% of the scientific, technical and engineering labor force.

Two reasons are offered for their underparticipation: One is preference; that is, women tend to prefer careers that allow them to balance marriage, family and other responsibilities. A second

reason, which Leggon suggested is the major factor discouraging women from these careers, is that salaries in these careers are significantly lower for women than for men in almost all fields, in every sector of employment, and at comparable levels of experience. In other words, women do not get a sufficient return on their investment of education and effort in the scientific, technical and engineering fields.

Underrepresented racial and ethnic minorities -- The underrepresentation of certain racial and ethnic minorities in the scientific, technical and engineering fields will contribute greatly to the projected gap between supply and demand of personnel. By the year 2000 demographers project that one in every three Americans will be non white, and already minorities are the majority of school enrollment in 23 of the nation's 25 largest cities.

Leggon stressed the importance of looking more carefully at certain of the categories which are too gross and which contain subgroups which differ greatly demographically and in their representation in these fields. For example although Asians as a whole may be overrepresented in the scientific, technical and engineering fields, Philipinos are not. Also, Hispanics need to be stratified into subgroups for this analysis, as there are major differences between Chicano or Mexican Americans and Puerto Ricans, Cubans, Central Americans and South Americans. Ethnic groups also must be disaggregated by gender. For example the picture is very different for Black men and women. Although this does not necessarily mean that policy and program development must be targeted to each subgroup, differences between the subgroups should be kept in mind when planning programs to increase recruitment and retention.

Leggon emphasized that although she was talking about numbers, the qualitative dimension also needs to be addressed. A qualitative analysis is needed both to understand reasons for these four groups' underparticipation in the scientific, technical and engineering fields, and for policy and program development, implementation and evaluations, which are largely qualitative in nature.

Leggon concluded by noting the confluence between the ethical and economic issues. Ethically it is just, right, and democratic that more women and minorities be recruited to the scientific, technical and engineering fields. It is also economically imperative that this be accomplished; we must maximize all of our resources, particularly human resources, in order to remain viable in the competitive international economic arena.

DESIGNING PROGRAMS FOR RECRUITING WOMEN INTO ENGINEERING & TECHNOLOGY

Prof. Carolyn A. Fazzolari
Department Chairperson
and
Dr. Marianne B. Carlin
Assistant Professor

Mechanical Engineering Technology
College of Staten Island

Prof. Fazzolari and Dr. Carlin described the Engineering Technology Program for Women, also called The Brighter Tomorrow program, at the College of Staten Island. This is a program aimed at encouraging women of all ages to consider a career in engineering or technology.

Prof. Fazzolari spoke first. She discussed some of the obstacles that prevent women from entering the engineering and technology fields and the efforts of their program to overcome these obstacles.

One major obstacle is that fewer women than men even consider the possibility of a career in those fields. One main reason for this is stereotypes about male and female careers. Among high school students, there is peer pressure against pursuing a non-traditional career, against breaking from what Prof. Fazzolari called the "pack tradition." Other important reasons females tend not to choose engineering and technology careers are lack of sufficient confidence in math and feeling uncertain and "alien" in a technical environment. These as well as other obstacles have been addressed by the Brighter Tomorrow program.

In its first year the program worked primarily with high school girls. They met for six hours on each of eight consecutive Saturdays. They were given the opportunity to work with and meet with women engineers. The morning sessions were primarily devoted to speakers on the different engineering fields. To help the girls feel that engineering and technology are not exclusively "macho" domains, women engineers from cosmetics, soap and food companies described the engineering and technical aspects of the design, production and packaging of those products.

In the afternoons there were luncheons where the students met young female and male engineering and technology students from the college, and there was laboratory experience where they did "hands on" work. The young women were very apprehensive about the labs, but experienced a great sense of accomplishment as they succeeded, which the program insured they would.

There was a great deal of work on math anxiety, including an entire session devoted to helping the students cope with and lessen their anxiety, led by a psychologist and a mathematician.

In addition to the formal supports provided by the program to

help the girls feel comfortable and confident, the girls provided each other with a great deal of informal support. This was encouraged. For example, if students wished to work on a project with a friend, that was completely accepted. A number of "sister" relationships developed, which seemed to very helpful to the girls.

Very important to the program was a great deal of support from the Board of Education. Professors Fazzolari and Carlin met with superintendents of schools in Staten Island and Brooklyn and with the head of the guidance program. They went to Parents Association meetings, spoke with principals, and went directly to classrooms to talk with students.

At the end of the program, the percentage of participants who said they were definitely sure they would consider a career in engineering or technology increased from 19% to 38%, a 100% increase. The unsure category decreased by 13%, which was seen as positive, because even if the young women felt they did not want to go into those careers, they now could make that decisiqon wisely, with some knowledge, and not simply because of fears or stereotypes.

The idea for the second phase of the program was suggested by an interesting observation during the first phase. When the mothers came to pick up their daughters they were so interested and curious about the labs that it was almost impossible to get some of them to leave! Therefore, in the second year, the program was designed for adult women returning to college.

Several means were used to reach and recruit students (such as sending out brochures, speaking at "Y's" etc.), but all of the 25 students came to the program through an article in a local Staten Island Newspaper.

These women had both some advantages and some disadvantages as compared to the high school students of the first phase, or to the traditional 18 to 24 year old college student. They were much more pressed for time. Many worked, and some had children. They often had to deal with their family's lack of support or resistance; there was a sudden increase in children getting sick on Saturday mornings and desperately needing their mother to be home with them. Their academic skills in science and math were lower, and they had less computer experience. However, on the positive side, they had much stronger English composition and speaking skills than the younger students. They were also much more realistic and clearer about their career goals.

A number of things were done differently in this program than with the high school girls, in order to accomodate to the particular strengths and weaknesses of these older women. Less time was spent on career orientation, and more time on math, computer and lab skills. There was a great deal of support given and specific work on dealing with math and science anxiety, including training in some relaxation exercises, such as

visualization techniques. As with the younger group, efforts were made to counteract the "macho" image of the engineering and sciences fields and to make math and science more accessible to the women. The text books tend to use examples with cars and airplanes to make problems interesting (to the assumed male readers). So the instructors developed their own examples from the women's experience, such as cooking and sewing.

The women were given a lot of information about the College of Staten Island, whereas the high school girls were more likely to go to more prestigious schools, given their stronger academic backgrounds and greater flexibility (not having the family and other responsibilities of the older women).

During the program, there was a tremendous growth in the women's confidence. They were comfortable around and had come to enjoy working with the computers and other equipment, a marked change from the considerable fear and hesitance they showed at the outset. Sixty-six percent of the women who finished the course said that they were going to enroll in an engineering or technical course; 27% said they might do so. Fourteen of the fifteen surveyed said their ideas about their technical capabilities had changed. One woman expressed this by saying that she finally realized that the only difference between an engineer and herself was a degree.

THREE INNOVATIVE APPROACHES TO MINORITY RECRUITMENT

Deborah Hairston, Coordinator of Recruitment
Fiorello H. LaGuardia Community College

The main thesis of Deborah Hairston's presentation was that the traditional kinds of college recruitment events are of very limited utility; statistics show that the numbers who enroll from these events is very low. At the typical recruitment event, a group of colleges set up tables in a room, each one vying with the others to present the most attractive brochures and visual displays. Hairston suggested that little of substance is communicated to students in these contexts, and she described several alternative approaches which have been found to be much more effective.

Of the various approaches presented, one also involves going to the high schools and speaking with students. However, the focus is different. A career day is organized, where college faculty and professionals already working in the field talk with the students about a particular career. They describe to the students what the actual work in that field involves. Many students do not really know, for example, what it is that engineers or certain kinds of technicians actually do. Students are also told what college courses they need to take, and what they need to do while still in high school to prepare themselves for a particular career.

Another innovation for high school students is an "adopt-a-school" program, currently being set up at La Guardia, where companies affiliated with the college would provide scholarships. The scholarships would not be for top students, but for middle students, with high school averages around 75. These are students who would not receive other kinds of scholarships. These will be merit scholarships awarded to students who have made contributions to their community or their school: they are not based on academics or on income.

Programs, such as this, to help provide financial resources are vital because one of the main factors affecting minority students' decision to attend or not to attend college is income. Something as simple, for example, as making sure students know what financial aid they are eligible for and that they apply on time, is extremely important. Some eligible students do not apply, and many apply too late in the year.

Another innovative approach is to reach children at an earlier age, when it is likely to be more effective. Hairston notes that there are high dropout rates in junior high school as well as in high school.

One of the best ways to influence students before high school is through their parents. Hairston and her colleagues have found it easier to reach elementary and junior high school parents than high school parents, as the parent association meetings in the

younger grades are much better attended than are high school parent association meetings.

When they meet with the parents, the goal is to teach them how to foster in their children positive attitudes and feelings about school, and an orientation towards going to college. Parents should show interest by, for example, asking children about their school day and checking homework. Hairston notes that parents are usually much less involved in their children's school activities when they reach high school. For example, they no longer ask their children about what they are doing in school, and they let the children make all the decisions about what courses they will take. Hairston believes this is a mistake, and that parents need to remain actively involved throughout high school. However, she cautions against expressing to children the attitude that after junior high school, education is no longer to be fun or enjoyable, that "we're down to some serious business here." Education should be fun on all levels; learning is exciting, and this is the feeling that parents should reinforce.

High self esteem is also very important for success. A major reason students do not apply for college is their feeling that they are not academically prepared, or not capable enough. Therefore, work with parents includes discussion of how they can enhance their children's self esteem, how they can help their children realize that they are capable, and teach them that if they can enjoy the process of learning, it is easier.

In addition to meeting with parents of younger children (elementary and junior high school), Hairston and her colleagues also work directly with junior high school students. The students are given mentors, college students who work with them, provide tutorial services, and talk to them about college. They learn about what they will need to do to prepare for college and how their junior high school courses relate to what they might do in college. They spend time at the college and experience the college environment; some do work in college labs. This is an exciting and motivating experience for them.

A third non-traditional approach to recruitment is to use the churches, which are very receptive to having people from the college come and talk with their youth. This is particularly effective for recruiting minority students, in whose communities the church often plays an important role.

Finally, another innovation, very helpful for recruiting working adults, is to have the recruitment office open evening hours and on Saturdays, to give working adults access to advisement.

WOMEN AND MINORITIES IN SCIENCE AND TECHNOLOGIES: HOW DO WE STACK UP?

Robert M. Jefferson, Associate University Dean
Director of Student Affairs, C.U.N.Y.

The main theme of Robert Jefferson's talk was that the City University of New York does not have the same problem in regard to enrollment of women and minorities in science and engineering technologies as suggested by the national figures and the figures for other institutions cited by the previous speakers. The problem is more one of retention, and in particular, teaching and curriculum.

First, apart from questions of gender or ethnicity, C.U.N.Y. community college students enroll in math, science and technologies programs in fairly substantial numbers--about 22.3% (not including data processing). This compares to 32% in business and commerce technologies and 23.2% in liberal arts. Among bachelors degree students at the upper division level, the percentage of math, science and engineering technologies majors is actually slightly higher than the percentage of business and management majors--22.6% as compared to 22.3%. This trend continues at the masters level where math, science and engineering majors (at 18.7%) are second only to education majors, and at the doctoral level where they are the largest group (26.7%)

Second, in regard to minorities and women, C.U.N.Y. is somewhat unique in its large percentage of women and minority students and in their rates of enrollment in the sciences.

At the community colleges, women are 59% of the enrollment, all minorities together are 74% of the enrollment, and Blacks and Hispanics alone are 67.2% of the enrollment.

In every science program in the community colleges, minority students are enrolled at a higher rate than their percentage of the population in that school. For example, in Health Technologies, minorities are 78.4% of all enrollees, and Blacks and Hispanics alone are 72.9%. In Computer and Information Sciences, total minority enrollment is 83.6%, and Blacks and Hispanics alone are 72.9%. In nursing, total minority enrollment is 76.9%, and Black and Hispanic enrollment is 72.3%. Only in the engineering technologies are Blacks and Hispanics enrolled at a slightly lower rate than their percentage in the colleges'population; they are 65.9% of the engineering technology students. Total minority enrollment in engineering technology, at 79.7%, is above their overall percentage in the community college population.

Regarding women: Of all Associate degrees awarded women in 1986-87, 21% were in the Health Science and Engineering Technologies. For men, the figure is 32.9%. However, because the absolute number of male students is lower than the number of female

students, the actual number of male and female graduates in those areas is quite close--a little over 9,000 women and something over 10,000 men.

The figures for Health Sciences include Nursing. Because nursing has been a stereotypically and traditionally female profession, some questioners from the audience suggested that figures for nursing enrollment ought not be included in reporting percentages of women in the sciences. Without including nursing, there would be a much larger gender gap in science and engineering technology enrollment. Jefferson argued, however, that nursing <u>is</u> a science, that it in fact carries more math and science requirements than many other fields included in the engineering and science technologies areas, and that it should not be devalued as a science area.

However, Jefferson did stress that there is still a big gap between males and females and between whites and minorites in the pure math and the physical science areas. For example, at the bachelor's degree level (where total Black and Hispanic enrollment is 43%) the pure math major and the physical science majors are the only two of the math, science and technologies areas where Black and Hispanic students are enrolled at a lower rate than their percentage in the student population. However, students across the board (male and female, minority and non-minority) are opting out, or being pushed out, of math and science. This is at every level (from Associate Degree to Doctoral Degree), more so in the physical sciences and math, but also the biological and medical sciences.

Despite the positive data regarding percentages of women and minorities enrolled in science and engineering technologies at C.U.N.Y., there is a serious problem, and that problem is not so much one of recruitment as one of retention in these fields.

The data cited show that students, especially minority students, are applying in large numbers to science based programs. They see the sciences as offering good career opportunities. They have high aspirations and motivations for the science areas, but then drop out of these areas in large numbers. (In all majors, the graduation rate for Black and Hispanic students is lower than that for white students.) So the problem is not one of convincing them to apply to these programs. Rather, the problem is that many of them have very weak math and science backgrounds. (An exception among the Black and Hispanic students are the Caribbean students, who are more likely to come with solid backgrounds in math and science.)

In other words, the problem is not lack of interest, but rather, not knowing how to achieve in the science and technology areas. This is on the part of both the learner and the teacher. Many faculty would really like to know how to better teach these students. Thus, Jefferson's main conclusion is that there needs to be a greater focus on teaching. Teaching strategies must be

adapted for the various groups and their educational backgrounds. The university must place greater emphasis on faculty development and curriculum development.

RECRUITMENT PLUS WHAT?*

Dr. Lloyd M. Cooke, Moderator
President, LMC Associates,
Consultant, Math & Science Education

Dr. Cooke first commented on one aspect of Robert Jefferson's presentation. He stated that grouping health services and paramedical technologies and mechanical engineering technologies, as Mr. Jefferson did, is problematic because, as the tables to which Mr. Jefferson referred show, there is a great disparity between women in mechanical engineering technologies, 1%, and men, 16.6%. So, in fact there is a problem at C.U.N.Y. of inequality between women's and men's enrollment in the sciences. It is not solely a question of retention.

Dr. Cooke also spoke of the problem that there are limited numbers of Black and Hispanic high school students prepared to face the engineering curriculum as it exists in most colleges, that is, students with three years of high school math and two years of physical sciences. Therefore, the focus for intervention needs to be before high school--at least as early as the seventh grade, since a child who is two years behind in math will be discouraged from taking algebra one in high school. And to take calculus (which is beginning to be required even for non-science baccalaureates), a student must have taken algebra one and two, geometry, triogonometry, and, usually, pre-calculus. Some new approaches are necessary to enable students who would now not even enter that sequence to be able to do so. There is currently research underway testing the hypothesis that a student's arithmetic knowledge does not predict his or her ability to do algebra, and there are two experimental programs in Detroit and Atlanta where seventh graders who are behind in arithmetic are going into Algebra One and making it.

Another question raised during the panel presentations was how to involve parents to encourage more women and minorities to enter the sciences. Dr. Cooke emphasized the importance of this approach and spoke of an American Association for the Advancement of Science program called "Linkages" which works with various community organizations (girls clubs, the National Urban League, two Native American Indian schools), and another program with the Black churches. These have shown very promising results.

The issue is not whether the problem is one of recruitment or one of retention, Dr. Cooke asserted. Both are important. He expressed his agreement with the point, raised by all of the panelists, that the programs into which we recruit must be prepared well and the pedagogical methods must be designed to meet the needs of the women and minority students we are trying to recruit. Also, as several of the panelists pointed out, support is vital.

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* Dr. Cooke's planned presentation was cut short due to time constraints.

APPENDIX B

ADDITIONAL TAKE-HOME MATERIALS -- RECRUITMENT CONFERENCE

ADDITIONAL TAKE-HOME MATERIALS -- RECRUITMENT CONFERENCE

Metropolitan Area & New York State:

1. "Study Tracks Hispanic Community," by Nadine Brogan. The New York Times, December 18, 1988, p. 74.
2. "Report Finds Fewer Jobs For High School Dropouts," The New York Times, December 18, 1988, p. 74.
3. "Panel Finds New York Blacks In Crisis And Lists Remedies," by Dennis Hevesi. The New York Times, December 10, 1988, pp. 1, 32.
4. "An Approach to Increasing the Representation of Minorities in Engineering and Science," by Howard Kimmel, et. al., Engineering Education, December 1988, pp. 186-189.
5. "Soon It'll Be Nueva York," by Gus Dallas. The Daily News, November 27, 1988, pp. M1, M3.
6. "The Region: Back To School -- For New York City, The Lessons Are Hard And Gold Stars Few", by Neil A. Lewis. The New York Times, September 4, 1988, p. E7.
7. "For Dropouts, Finding Jobs Is Tough Task," by Suzanne Daley. The New York Times, August 1, 1988, pp. B1, B4.
8. "SUNY Number Of Minorities Is Lagging," by Michael D'Antonio. Newsday, June 13, 1988, pp. 4, 17.
9. "State Test Results Going Up, Dropout Rates Going Down," Learning In New York, New York State Education Department, March 1988, pp. 4, 5.
10. "Can Scholarship Plan Stem The Dropout Rate?" by Lee A. Daniels. The New York Times, January 27, 1988, p. B9.
11. "Afternoon Program Keeps Bronx Students In School," The New York Times, January 27, 1988, p. B9.

Other States:

12. "Fewer Degrees For Black Men In Maryland," The New York Times, November 16, 1988, p. B8.
13. "On Homework, More May Be Less," The New York Times, September 7, 1988, p. B9.
14. "Minority Pupils Are Found Behind Early In Math," The New York Times, July 20, 1988, p. B6.
15. "Students: Colleges In California Seek New Ways To Expand Pool Of Hispanic Students Prepared For Higher Education," by Cheryl M. Fields. The Chronicle of Higher Education, September 30, 1987, pp. A31, A33, A34.
16. "What Works: California's Minority Engineering Programs," by Cheryl M. Fields. The Chronicle of Higher Education, September 30, 1987, p. A33.

United States -- General Information:

17. "Jackson And Others Say `Blacks' Is Passe," The New York Times, December 21, 1988, p. A16.
18. "Now, To Figure Why The Poor Get Poorer," by Leonard Silk. The New York Times, December 18, 1988, Section 4, pp. 1, 5.
19. "Many In U.S. Face Bleak Job Outlook," The New York Times, November 19, 1988, p. 8.
20. "School And College Graduates Put At Record Number In U.S.," The New York Times, September 22, 1988, p. A22.
21. "During the next 12 years as the country enters a period of labor shortage, 83% of the 20 million new entrants to the workforce

United States -- General Information (Cont'd):
will be women, minorities and immigrants ..." Manpower Comments, July/August, 1988, p. 11.
22. "More Foreigners Are Seeking PhD's In U.S.," by Amy Stuart Wells. The New York Times, July 20, 1988, p. B6.
23. Changing America: The New Face Of Science And Engineering, Draft of Interim Report of the Task Force on Women, Minorities, and the Handicapped in Science and Technology, June 30, 1988, pp. 1-8,
24. "Some Miss Out On Benefits Of Computers," The New York Times, September 7, 1988, p. B9.
25. "Freshman Engineering Enrollments ..." Manpower Comments, September 1988, p. 21, 22.
26. "Lessons: Behind Americans' Problems With Math, A Question Of Social Attitudes," by Edward B. Fiske. The New York Times, June 15, 1988, p. B8.
27. "Hands-On Science Instruction Declining," by Robert Rothman. Education Week, March 9, 1988, p. 4.

United States -- Minorities:
28. "Minority Students Gain In College Credit Exams," The New York Times, December 21, 1988, p. B8.
29. "Engineering Freshmen Down, Minorities Up," Engineering Times, November 1988, p. 18.
30. "U.S. Hispanic Population Is Up 34% Since 1980," The New York Times, September 7, 1988, p. A20.
31. "Hispanic Dropout Rates Puzzling," by Deirdre Carmody. The New York Times, August 17, 1988, p. B8.
32. "In 1986-87, 57% of the 12.5 million students enrolled in higher education in the U.S. were attending full-time. Among these, 0.6% were American Indians, 8.9% were black, 3.7% were Asian, 4.3% were Hispanic, 3.6% were foreign and 78.8% were white, non-Hispanic ..." Manpower Comments, July-August 1988, pp. 21, 22.
33. "Will Minorities Fill The Big Engineer Shortfall?" by Alan Chapple. Engineering Times, July 1988, p. 16.
34. "In 1985, Hispanics who made up 8.2% of the 18-to-24-year old population accounted for just 4.3% of total college enrollment. ..." (refers to the May/June 1988 issue of CHANGE, all of which is devoted to "Hispanics -- Higher Education's Missing People"), Manpower Comments, June 1988, pp. 21, 22.
35. "After extensive examination of demographic and economic data, review of relevant research and consultation with numerous experts, the 37-member Commission on Minority Participation in Education and American Life has concluded that America is moving backward in its efforts to achieve full participation of minority citizens. ..." (refers to the report One-Third of a Nation), Manpower Comments, June 1988, pp. 19, 20.
36. One-Third of a Nation, A Report of the Commission on Minority Participation in Education and American Life, American Council on Education, May 1988, p. ix and Figs. 1-8.
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APPENDIX C

PRE-REGISTRANTS & ATTENDEES -- RECRUITMENT CONFERENCE

RECRUITMENT CONFERENCE REGISTRANTS

Pre-Registrants:

	Alice Adesman	LaGuardia CC & Dir of Voc Counseling, NYANA
*	Joseph B. Aidala	Prof/Chair, Elect Engrg Tech, Queensboro CC
	Emily Armstrong	Director of PROVIT, Borough of Manhattan CC
	Frances Avner	Dean, Academic Services, NYC Technical Coll
*	Gary Benenson	Assoc Prof, Dept of Tech, The City College
	Brian T. Buckley	Assoc Dir of Admissions, NY Inst of Tech
	Diane Call	(Dr) Dir of Coll Discovery, Queensboro CC
*	Peter Comeau	Advisory Council for Occ Ed, NYC Bd of Educ
	Shirley W. Harrison	(Dr) Chair, Dept of Physical Sci, Nassau CC
*	Patricia Ivers	Lecturer, Corp/Cable Communic, Boro Manh CC
*	Marcianne Harriott	(Dr) Proj Assoc, Parent Ed, CUNY Grad Schl
	Sonja L. Jackson	Exec Dir/Retention Services, NYC Tech Coll
	Evelyn R. Kish	Assoc Dean Students, Minority Prg, Bronx CC
*	Harold E. Levinson	Assoc Prof, Mech Engrg Tech, Queensboro CC
*	Pauline Luk	Counselor, NYC Technical College
*	Barbara Magid	(Dr) Dept Head, Chemistry Suffolk County CC
	Fred B. Malamet	(Dr) Assoc Dean Faculty, Kingsborough CC
	Deborah R. Moore	Academic Advisor, The City College
	Henry Ortiz	Asst Prof Mech Engrg Tech, NYC Tech Coll
	Bernard Ospitale	Lecturer Mech Engrg Tech, NYC Tech Coll
*	Dorothy Patrick	Co-Director of STEP, Suffolk County CC
	Jack Prince	(Dr) Dir Nucl Med Tech & Chr Phys, Bronx CC
	Anisia B. Quinones	(Dr) Exec Dir Access for Women, NYC Tech C
	Roberto G. Ramsey	President, Veterans Club, Medgar Evers Coll
*	Aida Ruiz	Dean of Academic Affairs, Hostos CC
*	Linda Silverman	Proj Dir JHS/HS Pre-Tech Prog NYC Tech Coll
*	Phyllis Sperling	Assoc Prof Architectural Tech NYC Tech Coll
*	Louise Squitieri	(Dr) Dir Science Technology Prog Bronx CC
	Vita C. Tauss	(Dr) Dean Instructional Servs Queensboro CC
	Richard Tiernan	CLT, Corp/Cable Communic, Boro of Manh CC
	Sheila Turner	Proj Dir Expanding Options Women NYC Tech C
	Herbert Tyson	Prof/Chair Dept Engrg Technologies Bronx CC
*	Michael Williams	Coordinator STEP, Suffolk County CC

New Registrants 1/6/89:

*	Karen Berry	Admissions Counselor, LaGuardia CC
*	Jacqueline Harriott	Lecturer Adult Contg Ed Peterboro Regl C GB
*	Blossom Harris	Project Dir NYC Technical College
*	Barbara Perkins	Dir Minority Recruitmt, PROVIT Boro Manh CC
*	Karen Steele	Asst Dean Instructional Servs Queensboro CC

* Attended 1/6/89 Conference/Workshop

APPENDIX D

BROCHURE & UPDATED PROGRAM -- RECRUITMENT CONFERENCE

A Conference & Workshop on Recruitment of Women & Minorities in Science & Engineering Technology Associate Degree Programs

PURPOSES

To present recent research findings, demographic trends, and successful experiences applicable to this issue; to provide participants with an opportunity to exchange information about their experiences; and to encourage participants to plan local projects related to recruitment.

WHO SHOULD ATTEND

Faculty, counselors, administrators and others at two-year colleges in New York State will find this Conference & Workshop of value in their professional work. Those engaged directly in recruitment activities or policy formulation will benefit by hearing others discuss their activities as well as by contributing their own expertise in small group settings.

LOCATION

The Conference & Workshop will be held in the third floor studio of the CUNY Graduate School and University Center at 33 West 42nd Street (Between 5th Avenue and Avenue of the Americas) in Midtown Manhattan.

Program Briefly

8 – 10 am
REGISTRATION CHECK-IN

9 am
WELCOMING REMARKS

9:15 am
KEYNOTE ADDRESS

- Dr. Cheryl B. Leggon
  Office of Scientific & Engineering Personnel
  National Research Council, Washington, D.C.
  "Demographic Trends in the Science, Engineering and Technology Labor Force: Projections, Predictions and Implications"

10 am
REFRESHMENT BREAK

10:15 am
PANEL

- Dr. Lloyd M. Cooke – Moderator
  President, LMC Associates
  Consultants, Math & Science Education
  "Recruitment Plus What?"
- Professor Carolyn A. Fazzolari
  Department Chairperson
  Mechanical Engineering Technology
  and
- Dr. Marianne B. Carlin
  Asst. Prof., Mechanical Engineering Technology
  College of Staten Island
  "Designing Programs for Recruiting Women into Engineering and Technology"
- Deborah D. Hairston
  Coordinator of Recruitment
  Fiorello H. LaGuardia Community College
  "Three Innovative Approaches to Minority Recruitment"
- Dr. Fred L. Pincus
  Senior Consultant
  Academy for Educational Development
  "Recruiting Low Income Students to Pre-Freshman Programs at CUNY Colleges"

12 Noon
CONFERENCE LUNCHEON

1:30 pm
SMALL GROUP SESSIONS WITH PANELISTS

2:15 pm
REFRESHMENT BREAK

2:30 pm
SMALL GROUP SESSIONS REPEATED

3:15 pm
WRAP-UP & FUTURE PLANNING SESSION

- Dr. Stanley M. Brodsky
  Director, New Project Development
  CASE/IRDOE, CUNY Graduate School
  Follow-up Projects
  Take-Home Resource Materials

4:00 pm
ADJOURNMENT

XEROX IF ADDITIONAL FORMS NEEDED

Registration Form

PARTICIPANTS PAY NO FEES **SPACE IS LIMITED** **PLEASE REGISTER EARLY**

☐ Please reserve a place for me at the Recruitment Conference/Workshop
☐ Please send me additional information

MAIL THIS FORM TO: Dr. S. M. Brodsky
CASE/CUNY
25 West 43rd Street, Room 620
New York, NY 10036
(Telephone 212 221 3895)

NAME (please print) TITLE

INSTITUTION

ADDRESS

TELEPHONE

This project is funded by a grant from the
New York State Education Department.
VEA No. 152 89 5113

DR. S. M. BRODSKY
CASE/CUNY GSUC
25 WEST 43RD STREET
ROOM 620
NEW YORK, NY 10036

A Conference & Workshop on Recruitment of Women & Minorities in Science & Engineering Technology Associate Degree Programs

FRIDAY, JANUARY 6, 1989
AT THE
CITY UNIVERSITY OF NEW YORK
GRADUATE SCHOOL AND UNIVERSITY CENTER

33 West 42nd Street, New York, NY

HOSTED BY THE CENTER FOR
ADVANCED STUDY IN EDUCATION
Institute for Research & Development
in Occupational Education

The Graduate School and University Center
of The City University of New York

Center for Advanced Study in Education
Institute for Research and Development in Occupational Education
33 West 42 Street, New York, N.Y. 10036
212 642 2942 FAX 212 719 2488

CONFERENCE & WORKSHOP ON RECRUITMENT OF WOMEN & MINORITIES IN SCIENCE & ENGINEERING TECHNOLOGY ASSOCIATE DEGREE PROGRAMS

Friday, January 6, 1989

PROGRAM

8:00-10:00 a.m.	REGISTRATION CHECK-IN
9:00 a.m.	WELCOMING REMARKS
9:15 a.m.	KEYNOTE ADDRESS o Dr. Cheryl B. Leggon Office of Scientific & Engineering Personnel National Research Council, Washington, D.C. "Demographic Trends in the Science, Engineering and Technology Labor Force: Projections, Predictions and Implications"
10:00 a.m.	REFRESHMENT BREAK
10:15 a.m.	PANEL o Dr. Lloyd M. Cook-Moderator President, LMC Associates Consultant, Math & Science Education "Recruitment Plus What?" o Professor Carolyn A. Fazzolari, Department Chairperson Mechanical Engineering Technology and o Dr. Marianne B. Carlin, Asst. Prof., Mechanical Engineering Technology College of Staten Island "Designing Programs for Recruiting Women into Engineering and Technology" o Deborah D. Hairston, Coordinator of Recruitment Fiorello H. LaGuardia Community College "Three Innovative Approaches to Minority Recruitment" o Robert M. Jefferson, Associate University Dean Director of Student Affairs, CUNY "Women & Minorities in Science & Technologies: How Do We Stack Up?"
12 noon	CONFERENCE LUNCHEON
1:30 p.m.	SMALL GROUP SESSIONS WITH PANELISTS
2:15 p.m.	REFRESHMENT BREAK
2:30 p.m.	FUTURE PLANNING SESSION o Dr. Stanley M. Brodsky Director, New Project Development CASE/IRDOE, CUNY Graduate School Follow-up Projects/Strategies Take-Home Resource Materials Wrap-up
4:00 p.m.	ADJOURNMENT

APPENDIX E

PRESENTATION SUMMARIES -- RETENTION CONFERENCE*

"Key Elements in Successful Retention Programs"
by Dr. Reginald Wilson

"Retaining Students and Maintaining Standards"
by Dr. Elsa Nunez-Wormack

"The Chilly Classroom Climate: Its Effect on the Learning and Retention of Women and Minorities in the Sciences"
by Prof. Sonja L. Jackson

"Headstart to College: An Intensive Pre-Collegiate Summer Program as a Retention Strategy"
by Dr. Diane H. Call and Dr. James J. Hennessy

"Highlights of the Last 18 Years of Retention of Minorities in Engineering"
by Dr. Lloyd M. Cooke

Summaries of Small Groups

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* These summaries of presentations were prepared by the Project Staff of CASE/IRDOE. We take full responsibility for any representation of the remarks by the speakers.

KEY ELEMENTS IN SUCCESSFUL RETENTION PROGRAMS

Dr. Reginald Wilson
Director, Office of Minority Concerns
American Council on Education, Washington, D.C.

Dr. Wilson began his talk with a presentation of some of the data from the American Council on Education's Annual Status Report on Minorities in Higher Education. This year there was a special section on Black males in higher education.

Black male enrollment in higher education is declining at a precipitous rate. Since 1982 when the first of these reports was published, there has been a steady decline in minority enrollment in higher education, particular among the two largest minority groups, Blacks and Hispanics. Paradoxically, although high school graduation rates of Blacks and Hispanics have increased more than any other group in the past ten years, the fastest decline in higher education enrollment has been among Blacks and Hispanics.

Among Hispanics the decline is proportional, but not numerical; that is, the number of Hispanics going to college has been increasing, but the proportion of the cohort, 18 to 24 year olds, has been declining. Among Blacks the decline is both proportional and numerical; that is, the absolute numbers of Blacks going to college has declined, and the proportion of 18 to 24 year olds Blacks going to college has also declined.

Among Blacks it is primarily Black males whose numbers in college have been going down drastically. However, despite some media reports which suggest that Black females are doing fine, in fact the rate for Black females has also been delining, although at a less drastic rate than the rate for Black males.

Back in 1976, a higher percentages of Hispanic and Black high school graduates than white high school graduates went on to college (35% among Hispanics, 34% among Blacks, 33% among whites). By 1986, the rate for Hispanics had declined to 29% and for Blacks to 27%.

Significant shifts in social policy are largely responsible for these dramatic declines over the past decade. The increase in minority college enrollment in the 1970's was largely a result of a number of social policies which afforded greater access, money and availability of higher education to minorities. (For example: Pell Grants, the Adams desegregation decision, greater enforcement of civil rights laws.) The decline in minority enrollments was precipitated by cutbacks and/or weakening of many of these programs and policies. Thus, Wilson concludes, Black and Hispanic students want to and will go to college, if given the opportunity. Therefore, rather than blaming the victim (i.e. what's wrong with minorities that they are not going to college), discussion needs to focus on what can be done societally and institutionally to

bring the enrollment figures at least back to their level of the mid 1970's. This would involve, at a minimum, restoring some of the successful social policies and programs of the 1970's.

In 1987 the National Commission on Minorities was formed by the American Council on Education to address this problem. It issued a report, "One-Third of a Nation" in May of 1988. The report documents the critical socio-economic indicators for minorities, the disappearance of minorities from campuses, and it also talks about what the nation needs to do about it. It concludes with seven challenges addressed to American society if we are to resolve this critical issue. The first and the seventh of these challenges concern education. The first says that higher education must substantially increase the recruitment, retention, and graduation of minorities in higher education. The seventh says that there must be more cooperation between the kindergarten to twelfth grade sector and the higher education sector. At present, there is extremely little such cooperation. Some aspects of the needed cooperation are the identification of student talent at an early age and efforts to motivate children in the early grades to think in terms of higher education.

The American Council on Education issued a report in January, 1988, entitled "Minorities on Campus," which presents specific programs and strategies that work in improving the recruitment and retention of minorities at all levels of higher education. It is intended to be used as a "cookbook," or practical guide; it does not discuss theoretical constructs. It provides information about institutions with successful programs, to illustrate what does and does not work. The institutions are identified, with addresses and telephone numbers provided. It is not an exhaustive list of all successful programs, but a large selection of examples which can serve as models.

Dr. Wilson discussed some of the important elements at the campus or institutional level that are associated with successful recruitment and retention of minorities and women.

* Presidential leadership: The most successful programs are those that have presidential support and leadership.

* Bringing in minority faculty: Dr. Wilson discussed some of the unnecessary barriers that hold back the recruitment of minority faculty, who serve an important role in recruitment and retention of minority students.

* Comprehensive programs: The most successful campus programs are usually comprehensive; they do not just focus on recruitment. It is necessary to look at the institution to find out what it has going for it that would make it attractive to minority and women students that would facilitate their staying and succeeding. This involves examining many aspects of the environment, including the social institutions and atmosphere. Where necessary, changes must be made.

* Accountablilty: In addition to having individuals in charge of recruitment and retention programs, responsibility needs to be shared throughout the institution. Rewards and incentives are needed. For example, individual people or departments can be cited for their successful work, departments can get additional budgets--or if they do not do well, there can be sanctions, such as budget reductions in a department.

* Evaluation: Most programs lack a significant evalution scheme. Evaluations should include, for example, students' scores at entry and exit, retention rates, percentages of faculty and students recruited from each recruitment source.

* Early identification and early warning of high risk students: A main contributor to failure is not identifying high risk students early enough. (This is particularly true for Black and Hispanic males, who are less likely to admit they have problems.)

Many students, particularly those going into science and engineering programs, start with handicaps in terms of course and grade background. Black and Hispanic students still have the lowest scores on high school science tests (in the sophomore year), and females score lower than males. On reading tests, males and females are relatively equal, but Blacks and Hispanics are significantly lower than whites. Blacks, Hispanics, and women take fewer of the competitive math and science courses, and also achieve, on average, lower grades than white students.

Wilson is an advocate of non-voluntary remedial or compensatory courses for students identified as at risk.

* Counseling and mentoring: Wilson advocates mandatory counseling at regular intervals, and not just when students think they need it or at registration time. Also needed are tutorial and remedial courses, especially in science, in critical thinking and in problem solving.

* Continuous assessment and diagnosis: These should be regular, throughout the course of the curriculum, with the goal being to provide needed help, not to eliminate students.

* Use of the full-time and the better faculty to teach the preparatory courses.

* Institutional commitment to the belief that minority and women students can succeed.

RETAINING STUDENTS AND MAINTAINING STANDARDS

Dr. Elsa Nunez-Wormack
Associate Dean of Academic Affairs for the
Freshman Program
College of Staten Island

Dr. Nunez-Wormack discussed the retention programs at the College of Staten Island and then described five components of these retention programs which help make them successful.

The College has 11 precollegiate programs, four of which are in science and technology. The Science and Technology Entry Program (STEP) is for high school and junior high school students. They come to the College of Staten Island every Saturday morning from 8:30 to 12:00. They receive no pay and no credit. They take courses in computer sciences, mathematics (from Sequential I all the way through Calculus), and Chemistry, Biology or Physics, depending on their level of achievement. Counseling and advisement are provided. The retention rate over 3 years is 92%.

There is also an extension of the STEP program at the college, the Collegiate STEP program, which creates a pipeline from the junior high school to the high school to the university. This past January, 1989, there was an intersession program similar to the STEP pre-immersion program. This is a basic skills, tuition free program.

The issue of retention is very complex. It is a college-wide effort. It is essential to create good will among faculty, staff and administrators. Even more key is the support of the President.

Five key components of the College of Staten Island's retention programs are the following:

1. Recruitment

Retention begins with recruitment. Recruitment officers should be well trained before they go out to speak at local high schools. Recruiters must let students know what they can realistically expect. For example, students who are interested in the nursing or engineering programs must be told that if they do not have the necessary prerequisite skills they may have to go into a pre-nursing or pre-engineering program. If students know in advance that they may have to take remedial or pre-science work they are less likely to feel frustrated or deceived and are more likely to be retained.

2. Knowing the population

An accurate profile of the freshmen who come to your institution is essential.

3. Testing, with appropriate program placements in remedial and developmental courses

Information on how students did in high school, as well as on C.U.N.Y. assessment tests, makes for more effective advisement,counseling and placement.

There are three programs to which students are assigned based on their performance on the C.U.N.Y. assessment tests: Anyone who has failed two or more of the C.U.N.Y. assessment tests is placed in a tuition-free program in the summer before they enter the college. The retention rate is about 82%. Some reasons for the high retention rates are that the instructors are handpicked, and the students get to complete their remedial requirements or at least advance one level of remediation before they begin their freshman year.

Once they begin the freshman year, there is a freshman workshop program which consists of a reading and writing course connected to a content course. These are team taught; the reading and writing instructor and the content instructor meet periodically throughout the semester.

Next there is a post-remedial transition program. This is to help students through that critical period when they are being mainstreamed. At this stage a content course is connected with a reading and writing course.

In addition, students who are finishing up their remedial sequence have an opportunity to work with professors who have been trained by English Department faculty on how to incorporate the reading instruction in the content course.

4. Continued support for students taking content courses

Support continues even after students have completed their required remedial courses. One form this takes is workshops attached to courses. For example, a workshop attached to a biology course focuses on vocabulary development, reading skills, and critical thinking, using course-related materials. These workshops are mandatory for some students, depending on their performance.

Another special program, developed two years ago, is called "Women Helping Women in Mathematics" where female students serve as mentors and tutors for other female students in the science and technologies program. This program has been very successful, and has just been extended to the high schools.

5. Advisement

In order to provide students with the most appropriate and helpful advisement, freshmen are classified into several groups of majors and other subpopulations. If a student has only failed one of the C.U.N.Y. assessment tests, had at least a 70 average in high school, and has declared a major, that student goes to advisement in the major department. Departmental faculty do excellent advisement for students who are very clear about what they want and are on level in their academic skills. However, they are less successful with students who are less directed or whose skills are not yet up to par.

A group of advisors made up of faculty, staff and administrators has created advisement teams which are trained to address the needs of specific populations, such as remedial students, readmitted students (students who had left on academic probation and are now re-entering), international students, part-time students, and disabled students. The remedial team, for example, is made up predominantly of English Department faculty and other concerned faculty and staff members. They meet at least two or three times a semester with their students.

Results -

Some evidence of the success of these programs is found in retention statistics. Of the freshmen who entered in 1986, 67% were retained at the end of one year. (Note that there is open admissions to this college's two-year program.) In addition, the 1988 annual report on freshmen, two years later, showed that this retention rate was sustained for those students; so it is a two-year retention rate. This year, graduation rates are being studied.

The 67% retention rate compares favorably to an average retention rate of 58% for the previous ten years and shows that the programs are indeed working.

THE CHILLY CLASSROOM CLIMATE: ITS EFFECT ON THE LEARNING AND RETENTION OF WOMEN AND MINORITIES IN THE SCIENCES

Professor Sonja L. Jackson
Executive Director for Retention Services
New York City Technical College

Professor Jackson began her talk with the comment that retention is an outcome of some of the good educational experiences that we can put into place for our students. One aspect which plays an important role in how students experience their education is classroom climate.

A chilly classroom climate is defined as a classroom climate that is not conducive to learning, one that does not spark interest in students and one that can and does cause students, especially minorities and women, to change their area of study or to leave the institution. While a chilly classroom climate is especially detrimental to minorities and women, (and particularly in the sciences where they are more vulnerable), it impairs the educational process for all students.

According to the literature, there are many ways in which a faculty member can contribute to a chilly climate. One way is to discourage classroom participation. Another is to prevent or discourage students from seeking help outside of class. Studies on retention have consistently shown that it is not only inside-the-classroom experiences, but also those outside the classroom--interactions with faculty, with counselors, and with peers--which are key to academic progress.

Many of the faculty behaviors that cause a chilly climate are not always even conscious behaviors. Some are quite subtle. According to the literature prepared by the Project for the Status of Women, some of these faculty behaviors are the following:

- ignoring of students
- interrupting of students
- maintaining physical distance
- avoiding eye contact
- offering little guidance and criticism
- attributing success to luck or factors other than ability

A chilly climate can cause students to drop out, or to drop or avoid certain classes or switch majors or specialties within majors. It minimizes the development of the individual. It undermines confidence and dampens career aspirations. Studies of retention issues show that self esteem and confidence are key to being successful in any kind of program.

In a chilly climate students, especially women and minorities, begin to act in a certain way. They begin to believe and act as if their presence in a given class, department, program or

institution is at best peripheral or at worst, an unwelcome intrusion. They feel that participation in class discussion is not expected and that their contributions are not important, and they participate less. Students may begin to feel that their capacity for full intellectual development and success is limited and that their academic and career goals are not matters of serious attention or concern.

These are powerful effects. Simply put, teachers do not usually know how powerful they are. Because a faculty member is a scholar in his or her discipline does not mean he or she is a good teacher. Teaching requires a great deal of energy and creativity. A teacher must, among other things, be willing to both offer information and accept information, as learning is interactive.

To make positive changes in the classroom environment or climate requires, first of all, institutional commitment. It then requires closely examining the instruction that is going on and creating a planned program of faculty development which make faculty members aware of behaviors and biases that may create a chilly classroom climate. It should also draw attention to teaching and learning and creativity. It must teach faculty how to present material, especially in the sciences, in a way that is not mysterious and makes students feel that they can learn it.

I entered Downstate Medical Center in the first year that the Radiologic Technology program was offered. We were a test case. At that time, to get students, some minorities were accepted into the program; two of us were admitted that year.

One of the first courses I took was an extremely exciting course in the dissection of a human body. A wonderful way to learn anatomy. We took a gross anatomy course in conjunction with the lab involving a full body dissection; a terrific course. I loved it; hands on experience and a wonderful way to learn. I came from a community college. The other folks at my lab table were from four-year colleges. There were people who had taken extensive work in the sciences; I had not -- just sciences at the entry level. They were folks who couldn't get into medical school and so went to some of the other professions such as physical therapy and occupational therapy. I was the only minority person at the dissection table. Every week as part of the requirements for the course, the instructor prepared a set of questions that we'd have to go home and research and be prepared to talk about when the instructor came to the table the next week and show on the cadaver what we were talking about. If we had six questions to study we never knew which one we'd get; we had to study all six.

This particular day the regular professor was out and an adjunct from the department came in. When she got to the table she looked over the questions and said "Okay Sonja, this is your question." Then she caught herself and said, "No, I don't want to give you that question, that's one for a physical therapist." I

said, "Excuse me, but I'm prepared to answer that question" and I did. When she isolated me in that way, she devalued me, and devalued my intellect. She was really saying that being in Radiologic Technology and perhaps female and Black I was not competent to answer that question.

Something as subtle as that could really have a drastic effect on your progression, self esteem, and ability to continue in the program. That's one example of a chilly climate.

I'll talk in the small group session about some specific policy recommendations which I think are key; but in summation I'd like mention one of the things Dr. Wilson said this morning, which I agree with. That is the need to find out what the institution has going for it that would make it attractive to minority and women students that would facilitate their staying and succeeding. This involves examining the institutional environment and atmosphere with changes made where necessary.

HEADSTART TO COLLEGE: AN INTENSIVE PRE-COLLEGIATE SUMMER PROGRAM AS A RETENTION STRATEGY, Part 1

Dr. Diane H. Call
Director, College Discovery Program
Queensborough Community College

Dr. Call's presentation focused on the intensive summer program recently started at Queensborough Community College, which is seen as the first phase of an integrated effort to work with College Discovery students and support their educational experience throughout their time at the College.

One special characteristic of Queensborough's program is that there is a greater difference between students in this program and the college's regular student population than at the other branches of the City University of New York (C.U.N.Y.). Queensborough's College Discovery students have on average 40% less financial resources than the regular students, as Queensborough's student population is the most affluent within the entire C.U.N.Y. system, including both community and senior colleges. The College Discovery students are three times as likely to have failed all the C.U.N.Y. placement tests as the rest of Queensborough's population. So they are very different from the regular student population.

Dr. Call offered some comments about retention strategies in general: First, they must be "homegrown," developed uniquely for each college. Retention strategies are labor intensive, politically and financially difficult, and require extensive cooperation and effort. They must be integrated into all aspects of the student's experience, in the classroom and out, from the point of recruitment to graduation. Evaluation is key. It is essential for program development and also produces the hard data needed to defend the program and encourage the institution and funding sources to continue to support it.

What makes the intensive pre-collegiate summer program successful is its comprehensive nature. It integrates academic, counseling and social activities. For most of the students, this is the first time they have ever encountered a positive experience in an academic setting.

Staffing is important. The staff are not transients. Dr. Call picks them personally. This means that some of them are very expensive. They are longterm members of the college who teach the regular curriculum of the various departments duringthe year.

The small size of the program is very important. A conscious effort is made to create intimacy, personalization. Students share experiences, and are in classes together as a group.

Another important element is the intensity of the program. It is a six week program, four days a week, from 9:00 a.m. to 4:00 p.m. The program consists of academic classes, workshops, counseling, and social interaction. The students are constantly together. They occasionally have breakfast and lunch together. Students and faculty sometimes get together socially as a group. At the end of the program there is a formal luncheon and graduation. Dr. Call gives out certificates. The experience does not just result in movement on a pre- and post-test, but it also brings a tremendous development of confidence, and it establishes lasting friendships which are an important source of support throughout their years at the college.

Each day there are academic classes focusing on reading, which also incorporate writing, and there is a workshop. The workshops cover various topics. For example, one is an orientation, or introduction to college. Another deals with interpersonal skills, and is a good way of developing close relationships within the group. Another workshop explores careers, with the focus on clarifying goals, matching up interest and ability and skills and the reality of what is available to the student. Another workshop area is study skills.

In addition to the reading and the counseling workshops, half the students take a writing workshop and the other half take mathematics. Who takes which is determined based upon their major. Students in the technologies generally are assigned to math. (The teachers for these courses are, like all the others, carefully selected.)

After the students leave the program, Dr. Call maintains contact with them during the regular year on something of a "caseload" basis. The students also become involved in other programs during the year, where appropriate, such as C-STEP, a single parents group, etc. This is very helpful to them. They are also encouraged and introduced and mentored to work in a lot of co-curricular as well as academic areas. For example, Dr. Call often nominates them as student orientation leaders. They also participate in student government.

The evaluation of the program's effectiveness is presented by Dr. Call's colleague, Dr. Hennessy.

HEADSTART TO COLLEGE: AN INTENSIVE PRE-COLLEGIATE SUMMER PROGRAM AS A RETENTION STRATEGY, Part 2

Dr. James J. Hennessy
Associate Professor, Counseling Psychology
Fordham University

Dr. Hennessy spoke about the evaluation of the intensive pre-collegiate summer program at Queensborough Community College. There have been two components to the evaluation, first the traditional approach looking at end-point data of students who've gone through the program over the past 4 years and a second approach assessing more qualitative characteristics of the students at entrance and completion of the program.

End-Point Data Evaluation

End-point data refers to those kinds of indices that are available through the registrar's office or on transcripts, such as number of credit-bearing courses successfully completed, number of semesters of continuation in the program, success at completing the program or transfer to other institution.

There are now about 108 students who have gone through the program--about 20 for each of the past 5 summers. Data indicate that students who participated in the program tend to remain in school at substantially higher rates than students who did not participate but would have been eligible (the "control" students). Of those who came through last summer's program (1988), 100% registered again for the spring semester (1989).Where there is two-year complete data on students, approximately 70% of youngsters who went through the immersion program were still in school or had completed four semesters of study. That contrasts with approximatley 35% of the control students. So in terms of raw retention, the program seems to have contributed to students staying in school for a longer time.

In terms of grade point average (GPA), participants and controls differ, but not greatly. Participants' GPAs are a few decimal points above controls'. However, there are large, statistically significant differences in the number of credit bearing-courses completed by the participants as compared to the controls.

The overall retention rate of the first 4 years of the program is 60 to 62%. Included in that percentage are students who are still enrolled at Queensborough and moving towards their degree successfully, students who have transferred to other programs outside Queensborough (usually to 4-year institutions) prior to completing their degrees at Queensborough, and students who have graduated from the program (this last percentage is not that large).

Qualitative Evaluation

Beginning this past summer (1988) the focus of the evaluation shifted from those kinds of numbers as the best indicator of the effectiveness of the program. Now, rather than looking at end-point data, they assessed the characteristics of the students who were coming into the program at the time they entered. The characteristics looked at included: (1) Students' knowledge of what college requirements were like and about the demand characteristics of a community college compared to their high school experience. (2) How much family support did they expect to receive in going through college. (3) How many of their friends or peers from high school or their community were also going to be attending college and Queensborough Community College.

These areas of focus were derived from the models of attrition that Tinto, Pascarella and others have developed which suggest that institutional support, social and community and family support, and academic support are key factors in retention or attrition.

Some interesting findings emerge. A remarkably high proportion of students entering the program knew little or nothing about the credit system in college. They had very unrealistic expectations as to the number of credits they would be taking in their first semester of study. Some thought they wouldn't have to study more than a couple of hours a week, and would spend 20 to 30 hours a week in class. They were very unknowledgeable about the basic structure of college curriculum.

A high proportion of the students reported being very firmly committed to their major field of study. In the past summer's program 13 of the 20 participants had chosen technical areas, with the greatest number choosing electronic or data processing majors. They were very firmly committed to these choices. Also, they were certain they would pass all of the courses they would take, at levels higher than their achievement in high school, and that they would graduate on time. Sixteen of the 20 students were absolutely certain that within two years they would complete their degree and move on, in most instances, to four-year colleges. These expectations were not congruent with what had been found with students who had come through other programs before.

At the end of the summer program, students' attitudes and expectations about the college experience had been modified to some extent. They were more informed and knowledgeable about what credits meant, about the different credit loads of various courses, and had a better understanding of the likely time they would spend in class vs. the time they would spend studying. They were more aware of the importance of study time and of good study habits.

Another change over the course of the program was the development of friendships. At entry students reported having one or no close friends who would be attending the college in September. At the end of summer, all but one student reported an

increase in the number of close friends, people with whom they would be spending time in freshman year. There was increased cameraderie and cohesion of the group. Cohort identity and friendships, institutional and peer identity are factors which have been shown to contribute to retention success.

When they were asked what types of services they expected they would need when they came into college, most said academic advisement, and all said financial aid. Fewer looked for other kinds of services that traditionally come out of counseling centers such as career planning or personal counseling on issues that might affect their school performance. At the end of the program there was an increased expression of willingness to seek out career and vocational planning and personal counseling to help them better cope with the demands of college.

There was also less certainty about their major field. Those who had expressed commitment to being an ET major were less certain than they had been. Perhaps they had found out that the program may be different from what they had expected; they were more realistic.

Overall, this evaluation found that the program is enhancing survival skills. Students have a better appreciation of what the task demands will be, they have formed some friendships with peers, and are better prepared to deal with the demands of freshman year.

HIGHLIGHTS OF THE LAST 18 YEARS OF RETENTION OF MINORITIES IN ENGINEERING

Dr. Lloyd M. Cooke
President, LMC Associates Consultants,
Pre-College Math and Science Education

It's thrilling to see what has come along over the last 18 years in terms of being sensitive to personal, humanistic, staff selection, training of staff to really deal with students, who automatically are perceived as being on the margin (and many are). They are still at this late date very little prepared to understand what engineering is and might be about. Incidentally, the Detroit area pre-college engineering program through an NSF grant has a video available as well as a curriculum guide for high school students. It includes career information describing several engineering areas and what engineers do, and shows minority and women individuals participating in those jobs and training programs. Those are available through DAPSET in Detroit at no cost to review and return. You might find them useful--I can give you the address.

Something was said (I've about 25 items I think are important, all of them have been covered in some way by each speaker--a very thorough job)--so when I point out 2 or 3 now it's not to say they are more important than others but they are things you might be able to use soon.

In your list of materials you will find a document, Improving the Retention and Graduation of Minorities in Engineering, published 4 years ago when I was president of NACME to help people who were running precollege and college programs. This document is available from NACME. It covers not all of what you've covered, because it didn't get into the psychological factors and the group cohort experiences that each of you is finding is so important. But that's been evolving. In it, there's Chapter 10 on Academic Advising, and you have had this distributed to you. This was written by Gerald F. Paskusz of the University of Houston engineering program which has a higher retention rate in engineering for minority students than for white male students. Neither he nor I have been able to convince the Dean of Engineering (at least as of 2 yrs ago) that what's been learned in this program could be valuable for white male students as well. But a lot has been learned in the program that's been of inestimable value in terms of enabling sutdents to make choices, succeed, and be conscious of what's required in the college, because most of the minority students from urban schools who have the SAT scores and the math courses to be accepted in engineering were the leaders of the class and did damned little studying. They got through easy, without much studying. As I learned more about them, I wrote the booklet, "How to Study Smartly." It's working, it's been through four 30,000 printings and is available from NACME at 3 West 35th Street, New York, NY 10001 (212-279-2626). It's very popular with

teachers who say "Gee, I wish I'd known this when I was in college." What Paskusz did has been very successful at University of Houston. There was an existing bridge program between high shcool and college. With no cooperation from the math department, he developed a series of diagnostic tests that helped determine what fundamental math skills the student didn't have and calculus instructors would expect them to have. Instead of putting them into remediation, he designed a half semester program with three separate forms of math enrichment and skill development, so a student could then enter a regular calculus course. Now you are talking about calculus as being an important item in a two year college. I say it's imperative because most of what they will be taught in technology as well as engineering will be taught by teachers who will teach from the calculus point of view.

So it's very important that programs have a way of diagnosing the gaps in skill (not the SAT score which gives no clue about how the student is prepared to enter calculus as presently taught).

The other thing I heard repeated in some way today, is you must have an early warning system to identify problems early on and a counseling staff with the capability of ascertaining what it is that is causing the individual to slip.

I'll add one thing that hasn't been discussed that much. You have discussed it in terms of the value of students having a sense of belonging in the institution.

The other part of it is that there have been 3 major studies that have demonstrated that group study is extremely valuable. When I mentioned this to physicists at IBM about 3 years ago, they said, "that's cheating." In physics and math, they thought, if you can't learn on your own you're not learning well. But the evidence is very clear that it does make a significant difference to work in study groups.

SUMMARIES OF SMALL GROUPS

Denise Whethers & Dr. Elsa Nunez-Wormack

A staff training program at the College of Staten Island for the Freshman Program included a cross-section of counselors, HEO's (Higher Education Officers), and administrators; a total of forty-five advisors. The training tools were very exciting. They have videotaped the sessions which include financial concerns the students may have, basic problems an international student might have, and a variety of basic concerns; things you'd want to get across to the students.

They also have team leaders who are identified by a committee that is chaired by the Provost, so it's seen as very important; they have a lot of clout and institutional commitment. The team leaders then work more closely with the advisement groups. There are basically two teams, one is in technology, the other is in the humanities.

One of the things mentioned is that it's important to pick a person who is interested in the advisement process. The person who is identified by the committee has the prestige of being chosen to participate on the team.

Then there was an interesting discussion about what's going on at NYC Technical College in the Student Development Center. We talked about issues that are important across the board, and first of all we asked what's positive, what's good that's going on in the Center that you like. The first thing that was said was that there are sensitivity workshops conducted by the Center in the form of lectures, performing arts, and exhibits. They lend a certain tone to the institution that we felt was important.

In addition, it was explained that now counselors have access on a PC to each student's schedule and thereby facilitating reaching the student. There are limitations such as, there are only three counselors in the Center, and there is a problem in getting some of the departments and faculty involved in the advisement process, although many are cooperating.

Another issue related to the impact on retention, advisement, and orientation programs of the recent budget cuts and impending additional cuts. This is an important question. These programs are often seen as frills and may be reduced. We may have to get together to fight for preservation of these programs. In addition, Steve Gerardi talked about something he's very interested in; the Brookover Self Concept of Ability, a test which shows a student's self concept. His hypothesis is that if a student has a strong self concept, he or she is more likely to be retained at an institution than if the student does not. He's proposing at his institution, NYC Technical College, to conduct a study or a program based on this hypothesis. And, finally, a note of information. The pre-freshman immersion programs, even though there are cuts, will be funded at a higher level this year.

Prof. Sonja Jackson & Dr. Reginald Wilson (Sonja Jackson Reporting)

The group spent some time talking about perceptions of faculty about foreign students; and it culminated in a discussion on language. One member of the group said she was from a foreign country and was accustomed to spelling with the English tradition and there were red marks all over her paper when it came back. I asked one of our foreign students to write a profile of herself for our newspaper, since she's doing so well. She's South African and had spelled the word "program" as "programme." We also talked about how the academy deals with some of the issues we've been discussing in a meaningful way. We agreed that a key issue is establishing leadership to make these issues priorities in order to move them forward. Leadership is needed. It was also noted that more minority faculty leads to more successful minority students, and that has been documented. A book by Jacqueline Flemming, a professor at Barnard, on Blacks in college supports this.

Discussion was sparked by the statistics with regard to recruitment and education of students in science. In the whole U.S. in 1987 out of all Ph.D's awarded in all disciplines, 765 of the total were awarded to blacks. Over 5,000 were awarded to foreign born students.

Mentorship is critical. We talked a lot in our group about tenured faculty at our institutions. Some who are not performing up to par, and we can't get rid of them. One suggestion is a need to have uniformity of curriculum. Then if you have students consistently not doing well within your class, the leadership should look into that, e.g. in a physics class. There is a need to develop a grievance structure for students, beyond the office of Dean of Students, where they can bring suggestions; one idea was an creating an ombudsman. To make it easier for students to grieve without going through the structure of the whole institution.

Comment By Dr. Stan Brodsky

Students in engineering technology programs usually have a serious commitment to their programs. They want to be there, they want to finish the program and get out in the field and do the work of engineering technicians or technologists or transfer to become engineers. The paradox is that when they are studying they are turned off by math and physics courses even though these subjects are the basis of what they will earn their money with as technicians in the engineering fields. That's a problem of instruction. You have <u>motivated</u> students who are turned off by bread and butter items which are not presented in a way they can access or which gets them excited. That doesn't apply to everyone teaching those courses; there are exciting instructors. But we need more exciting instructors, better materials and better approaches.

Dr. Diane H. Call & Dr. James J. Hennessy

A couple of issues were raised and discussed without closure. One of these issues was the need for institutions at all levels to adapt to the new student bodies seeking education. Young people today need different forms of instructional and support services. So there is concern about how we deliver information to students and how we construct the institutions in which they learn. Part of that was to discuss remediation, and how we can define it or change it or adapt it or make it more supportive and less punitive. Another was a discussion of parental involvement and need to incorporate that, not just on the primary or secondary school level but also on college level; support of a family is important, attitudinally and financially.

Collaboration with the NYC Board of Education was discussed. There'll be a conference co-sponsored by the CUNY Office of Special Programs, and Office of Academic Affairs, and the Board of Education, which will be held May 12, at Brooklyn College. It is targeted for members of the academic community at secondary and college levels about college programs, transition to college, and collaborations between the NYC Board of Education and the Board of Higher Education.

The point was also made that students must take responsibility for their own destinies. They must be not only given support, but also be held accountable to make choices and work hard. If we expect more from them and they expect more from themselves, there will be greater achievement.

We have a number of documents from CUNY, if you'd like to look at them, on research and projects done with minority students, disadvantaged students, and just plain students. A large number of organizations are now working with and addressing these issues.

Diane Call also did a study of students transferring from Queensborough Community College to CCNY. A subgroup of those were engineering technology people. The study covered six semesters worth of students who transferred from QCC to CCNY in various curricula. Call looked at the articulation process from point of view of transfer credit and student satisfaction with the process itself and their success at CCNY. We've found that the fit between the programs which have articulation will increase the success rate (persistence) at CCNY. Also CCNY was finding that transfer students (who comprise 50% of CCNY's graduating class) do academically better than their native students (students who started at CCNY as freshmen). Thus, it showed that community colleges were providing what was needed academically. We interviewed faculty, department chairpersons, and surveyed transfer students regarding their satisfaction. They felt they were strongly prepared in math and the sciences. A large number of students went from pre-engineering to engineering and from engineering technology associate degree (AAS) programs into the Bachelor of Technology program. The students in the engineering programs had the highest level of persistence; 53% after five years. The students going from the AAS into the Bachelor of Technology did well, but there were a large number of students dropping out probably because they were employable, not necessarily

because they were in academic difficulty. The student perspective was that they needed more work with language. They had had some difficulty with language; many had taken ESL (English as a Second Language). They wanted more services at CCNY. They were more attuned to our kind of support structure and teaching methods at the community college. This was a big difference that the students expressed, and they missed their community college teachers. Even though the class sizes may have been the same, there was apparently something the community colleges do very well with regard to teaching.

APPENDIX F

ADDITIONAL TAKE-HOME MATERIALS -- RETENTION CONFERENCE

ADDITIONAL TAKE-HOME MATERIALS -- RETENTION CONFERENCE

Books & Monographs:

1. Minorities On Campus: A Handbook For Enhancing Diversity, Madeline E. Green, ed., American Council on Education, Washington, DC, 1989, 199 pp. Content highlights enclosed.

2. Workers and Jobs in the Year 2000: New York State vis-a-vis the Nation, New York State Assembly Program Development Group, Albany, NY, November 1988, 33 pp. Research report enclosed.

3. Minorities in Higher Education: Seventh Annual Status Report, 1988, Reginald Wilson, Deborah J. Carter, Office of Minority Concerns, American Council on Education, Washington, DC, October 1988. Executive summary enclosed.

4. Workplace Basics: The Skills Employers Want, Anthony P. Carnevale, Leila J. Gainer, Ann S. Meltzer, American Society for Training and Development and U.S. Department of Labor, 1988. Contents and references enclosed.

5. Women, Illiteracy And Poverty: Breaking The Cycle, An Issue Brief by the National Coalition for Women and Girls in Education, July 1988, 6 pp. Enclosed.

6. Changing America: The New Face of Science and Engineering, Draft of Interim Report of the Task Force on Women, Minorities, and the Handicapped in Science and Technology, Washington, DC, June 30, 1988. Executive summary and figures, pp. 1-8, enclosed.

7. One-Third of a Nation, A Report of the Commission on Minority Participation in Education and American Life, American Council on Education, May 1988. Summary and Figs. 1-8 enclosed.

8. Focus on Minorities: Trends in Higher Education Participation and Success, James R. Mingle, Joint Publication of the Education Commission of the States and the State Higher Education Executive Officers, Denver, July 1987. Selected text, tables and figures enclosed.

9. A Difference of Degrees: State Initiatives to Improve Minority Student Achievement, Report and Recommendations of the Task Force on Minority Student Achievement, State Higher Education Executive Officers, Denver, July 1987. Executive summary enclosed.

10. Minorities: Their Underrepresentation and Career Differentials in Science and Engineering, Linda S. Dix, ed., Office of Scientific and Engineering Personnel, National Research Council, National Academy Press, Washington, DC, 1987. Selected general items, pre-college items, and college-related items enclosed.

11. "School Enrollment -- Social and Economic Characteristics of Students: October 1985 (Advance Report)", Population Characteristics, Series P-20, No. 409, Bureau of the Census, U.S.

Books & Monographs (Cont'd):

Department of Commerce, September 1986, 14 pp. Selections enclosed.

12. Self-Regulation Initiatives: Guidelines for Colleges and Universities. Statement on Educational Diversity, Equality and Quality, No. 9, American Council on Education, Washington, DC, December 1984. Enclosed.

13. Design For Excellence: How To Study Smartly, Lloyd M. Cooke, National Action Council for Minorities in Engineering, Inc., 1984. Publication enclosed.

14. The Campus Climate Revisited: Chilly for Women Faculty, Administration, and Graduate Students, Project on the Status of Women, Association of American Colleges, Washington, DC, October, 1986.

15. Women Teaching For Change: Gender, Class and Power, Kathleen Weiler, Bergin & Garvey Publishers, Inc., Massachusetts.

16. Becoming A Master Student, College Survival, Inc., 2650 Jackson Blvd., Rapid City, SD, 57702-3474, 1-800-528-8323. Enclosed are several items distributed in a descriptive kit by College Survival, including:

A. "The Freshman Seminar Course: Helping Students Succeed", Virginia N. Gordon, Thomas J. Grites, Journal of College Student Personnel, July 1984, pp. 315-320.

B. Abstract of Student Persistence and Achievement: An Evaluation of the Effects of an Extended Orientation Course, Edwin H. Stupka, March, 1986.

C. "Delivering a Student Success Course to Minority Students"

D. "Guidelines for an Effective Course"

E. "Self-Esteem Builders"

F. "Why Girls Drop Out of Math and Science"

Bibliographies (All enclosed):

17. Selected Literature on Persistence Retention Strategies for Minority Students, Diane H. Call, James J. Hennessy, February 1989.

18. Women in Two-Year Colleges: An ERIC Bibliography, ERIC Clearinghouse for Junior Colleges, May 1988.

19. Helping Minority Students Excel: An ERIC Bibliography, ERIC Clearinghouse for Junior Colleges, April 1988.

20. Student Retention: An ERIC Bibliography, ERIC Clearinghouse for Junior Colleges, September 1987.

21. Focus on Minorities: Trends in Higher Education Participation and Success, James R. Mingle, Joint Publication of the Education Commission of the States and the State Higher Education Executive Officers, Denver, July 1987, pp. 37-39. Bibliography enclosed.

22. A Difference of Degrees: State Initiatives to Improve Minority Student Achievement, Report and Recommendations of the Task Force

Bibliographies (Cont'd):

on Minority Student Achievement, State Higher Education Executive Officers, Denver, July 1987, pp. 56-65. Bibliography enclosed.
23. Equity in Science and Mathematics: A Selected Bibliography, Consortium for Educational Equity, Rutgers, The State University of New Jersey, New Brunswick, NJ, February 1987. Also List of Publications and Order Form.
24. Non-Traditional Technical Problems for Women: Barriers and Facilitators to Learning, Christine L. Persico, Doctoral Dissertation, Teachers College, Columbia University, 1987. Selected bibliographic items enclosed.

Recent Articles (All enclosed):

25. "Vermont College and a High School in the Bronx Begin to Collaborate," Lee A. Daniels, The New York Times, February 8, 1989, p. B11.
26. "Jackson and Others Say 'Blacks' is Passe," The New York Times, December 21, 1988, p. A16.
27. "Study Tracks Hispanic Community," Nadine Brogan, The New York Times, December 18, 1988, p. 74.
28. "An Approach to Increasing the Representation of Minorities in Engineering and Science," Howard Kimmel, et. al., Engineering Education, December 1988, pp. 186-189.
29. "Education: Schools Try to Attract Women to Engineering. Who's Studying Engineering." Gannett Westchester Newspapers, November 20, 1988, p. B3.
30. "Fewer Degrees For Black Men in Maryland," The New York Times, November 16, 1988, p. B8.
31. "Engineering Freshmen Down, Minorities Up," Engineering Times, November 1988, p. 18.
32. "Poll Finds Americans Are Ignorant of Science," The New York Times, October 25, 1988, p. C10.
33. "School and College Graduates Put At Record Number in U.S.," The New York Times, September 22, 1988, p. A22.
34. "U.S. Hispanic Population Is Up 34% Since 1980," The New York Times, September 7, 1988, p. A20.
35. "Head Start Gets Credit For Rise in Scores," Dierdre Carmody, The New York Times, September 21, 1988, p. B9.
36. "Blacks Gain Again in College Admission Tests," Dierdre Carmody, The New York Times, September 20, 1988, p. A30.
37. "More Businesses and Schools Join to Attack Illiteracy in Workplace," Joseph Berger, The New York Times, September 8, 1988, p. A27.
38. Percentage of Women Employed and Percentage of Those Women in Managerial and Professional Jobs, Manpower Comments, September 1988, p. 20.
39. "New Information Technology Directions For American Education: Improving Science and Mathematics Education," Arthur S. Melmed, Robert A. Burnham, T.H.E. Journal, August 1988, pp. 64-68.
40. Girls Were 43% of the Finalists in the 39th International

Recent Articles (Cont'd):

Science & Engineering Fair, Manpower Comments, July-August 1988, pp. 28-29.
41. "Diversity is Keynote of State's Efforts to Assess Students' Learning," The Chronicle of Higher Education, July 20, 1988, pp. A17, A25, A26.
42. "NAEP: Results of the Fourth Mathematics Assessment," Forum, Education Week, June 15, 1988, pp. 28, 29.
43. 1988 Northwestern Lindquist-Endicott Report on Employment Trends for College Graduates in Business; Minorities in California Colleges; College Board Report, Summary Statistics, 1987-88. Manpower Comments, June 1988, pp. 25, 26.
44. "What Works: California's Minority Engineering Programs," Cheryl M. Fields, The Chronicle of Higher Education, September 30, 1987, A33.
45. "More Blacks Needed in Math, Science Graduate Studies," Education Daily, Vol. 20, No. 184, September 25, 1987, pp. 1, 5.
46. "Success Strategies For Minorities," Joseph Berger, The New York Times, EDUC pp. 18-21.

APPENDIX G

PRE-REGISTRANTS & ATTENDEES -- RETENTION CONFERENCE

RETENTION CONFERENCE REGISTRANTS (3/3/89)

Pre-Registrants:

	Ramona Brown	Dir Recruit/Retentn Minorities, City College
*	Francine Campone	Dir Student Developmt Center, NYC Tech Coll
*	Peter Comeau	Advisory Council for Occ Ed, NYC Bd of Educ
*	Winsome DaCosta	Prof/Coord Med Lab Tech, Hostos CC
*	Steven Gerardi	Coord, Academic Advisement, NYC Tech Coll
	Blossom Harris	Proj Dir Women's Program, NYC Tech College
*	Carmen Hernandez	Counselor SEEK Program, NYC Tech College
	Shirley Hinds	Assoc Dean Acad Affrs Allied Health Hostos CC
*	Henry Hirsch	Recruiting & Retention, The City College
*	Evelyn R. Keating	Prof/Counselor NYC Technical College
	Barbara Kostroff	Dean Division of Health, NYC Technical Coll
*	A. C. Lawrence	Prof/Counselor NYC Technical College
*	Ricardo E. Lopez	Prof/Math; Retention Committee Hostos CC
*	Pauline Luk	Counselor NYC Technical College
*	Patria Marin	(Dr) Counselor College Discovery Hostos CC
	Aida Ortiz Ruiz	Dean Academic Affairs Hostos CC
*	Reba Patterson	(Dr) Mathematics Medgar Evers College
	Marcia E. Powell	Coord Direct Admit Process NYC Technical Coll
	Anisia B. Quinones	(Dr) Exec Dir Access for Women NYC Tech Coll
*	Phyllis Read	Prof/Coord Tutorial Writing Bronx CC
*	Ron Slay	Dir Technology Learning Center NYC Tech Coll
*	Phyllis Sperling	Assoc Prof Architectural Tech NYC Tech Coll
*	Ann Sprayregen	Prof/Counselor NYC Technical College
*	Louise Squitieri	(Dr) Dir Science Technology Prog Bronx CC
*	Dana R. Sutton	Dir Grants & Development Borough Manhattan CC
*	Sheila Turner	Proj Dir Expanding Options Women NYC Tech C
*	Herbert Tyson	Prof/Chair Dept Engrg Technologies Bronx CC
	Michael Waxman	(Dr) Prof/Coord Freshman Course NYC Tech Coll
*	Denise Whethers	Counselor NYC Technical College

New Registrants 3/3/89:

*	Lori Minnite	Borough of Manhattan CC
*	Michael E. Neal	Exec Asst to Vice-Pres, Borough Manhattan CC
*	Angel Ortiz	Hostos CC
*	Caroline Urvater	Dir Student Incentive Award Prog NYC Tech C

* Attended 3/3/89 Conference/Workshop

APPENDIX H

PRELIMINARY PROGRAM & BROCHURE -- RETENTION CONFERENCE

CONFERENCE & WORKSHOP

RETENTION OF WOMEN & MINORITIES IN ASSOCIATE DEGREE SCIENCE & ENGINEERING TECHNOLOGY PROGRAMS

Friday March 3, 1989

At City University of New York, Graduate School
Hosted by Center for Advanced Study in Education
Institute for Research and Development in Occupational Education

PRELIMINARY PROGRAM

9:00 a.m.	WELCOMING REMARKS
9:15 a.m.	KEYNOTE ADDRESS o Dr. Reginald Wilson, Director-Office of Minority Concerns American Council on Education
10:00 a.m.	REFRESHMENT BREAK
10:15 a.m.	PANEL o Dr. Lloyd M. Cooke, Moderator President, LMC Associates o Dr. Elsa Nunez-Wormack, Associate Dean of Academic Affairs for the Freshman Program College of Staten Island o Professor Sonja L. Jackson, Executive Director for Retention Services New York Technical College o Dr. Diane H. Call, Director, College Discovery Program Queensborough Community College o Dr. James J. Hennessy, Professor, Graduate School of Education Fordham University
12 noon	CONFERENCE LUCHEON
1:30 p.m.	VIDEO SESSION & DISCUSSION
2:15 p.m.	REFRESHMENT BREAK
2:30 p.m.	SMALL GROUP SESSIONS WITH PANELISTS
3:15 p.m.	WRAP-UP & FUTURE PLANNING SESSION o Dr. Stanley M. Brodsky Director, New Project Development CASE/CUNY
4:00 p.m.	ADJOURNMENT

TO: Dr. S. M. Brodsky, CASE/CUNY, 25 West 43rd Street, Rm. 620, N.Y., N.Y. 10036
(212-642-2938)

Please send final announcement brochures (how many? _____) to:

Name: _____

Mailing Address: _____

_____

A CONFERENCE & WORKSHOP ON

RETENTION

OF WOMEN & MINORITIES IN SCIENCE & ENGINEERING TECHNOLOGY ASSOCIATE DEGREE PROGRAMS

PURPOSES

To present recent research findings, demographic trends, practical interventions and successful experiences applicable to retention; to provide an opportunity for participants to exchange information about their experiences; and to encourage participants to plan or enhance local projects related to student retention.

WHO SHOULD ATTEND

Teaching faculty, counselors, administrators and others at two-year colleges in New York State will find this Conference & Workshop to have relevant value in their professional work. Those engaged directly in retention activities or policy formulation will benefit from the resource materials and by hearing others discuss their activities as well as by contributing their own expertise in small group settings.

LOCATION

The Conference & Workshop will be held in the third floor studio of the CUNY Graduate School and University Center at 33 West 42nd Street (Between 5th Avenue and Avenue of the Americas) in Midtown Manhattan.

Program Briefly

8–10 am
REGISTRATION CHECK-IN

8:30 am–11 am
COFFEE AND

9 am
WELCOMING REMARKS

9:15 am
KEYNOTE ADDRESS

- Dr. Reginald Wilson
  Director, Office of Minority Concerns
  American Council on Education, Washington, D.C.
  "Key Elements in Successful Retention Programs"

10 am
PANEL

- Dr. Lloyd M. Cooke–Moderator
  President, LMC Associates
  Consultants, Pre-College Math & Science Education
  "Highlights of The Last 18 Years on Retention of Minorities in Engineering"
- Dr. Elsa Nuñez-Wormack
  Associate Dean of Academic Affairs for the Freshman Program
  College of Staten Island
  "Retaining Students & Maintaining Standards"
- Prof. Sonja L. Jackson
  Executive Director for Retention Services
  New York City Technical College
  "The Chilly Classroom Climate: Its Effect on the Learning & Retention of Women & Minorities in the Sciences"

- Dr. Diane H. Call
  Director, College Discovery Program
  Queensborough Community College

  AND

- Dr. James J. Hennessy
  Professor, Graduate School of Education
  Fordham University
  "HEADSTART To College: An Intensive Pre-Collegiate Summer Program as a Retention Strategy"

11:45 am
CONFERENCE LUNCHEON

1:15 pm
VIDEO SESSION & DISCUSSION

2 pm
SMALL GROUP SESSIONS WITH PRESENTERS

3:15 pm
SUMMARIES & FUTURE PLANNING SESSION

- Dr. Stanley M. Brodsky
  Director, New Project Development
  CASE/IRDOE, CUNY Graduate School
  Take-Home Resource Materials
  Follow-Up Projects
  Evaluations

4:00 pm
ADJOURNMENT

TEAR HERE AND MAIL **XEROX IF ADDITIONAL FORMS NEEDED**

Registration Form

PARTICIPANTS PAY NO FEES **SPACE IS LIMITED** **PLEASE REGISTER EARLY**

☐ Please reserve a place for me at the Retention Conference/Workshop

MAIL THIS FORM TO: Dr. S. M. Brodsky
CASE/CUNY
25 West 43rd Street, Room 620
New York, NY 10036
(Telephone: 212 642-2958)

NAME (please print) _____ TITLE _____

INSTITUTION / AFFILIATION _____

RESPONSIBILITY _____

MAILING ADDRESS (street, city, state, zip) _____

TELEPHONE(S) _____

A CONFERENCE & WORKSHOP ON

RETENTION

OF WOMEN & MINORITIES

IN SCIENCE & ENGINEERING TECHNOLOGY

ASSOCIATE DEGREE PROGRAMS

FRIDAY, MARCH 3, 1989
AT THE
CITY UNIVERSITY OF NEW YORK
GRADUATE SCHOOL AND UNIVERSITY CENTER

33 West 42nd Street, New York, NY

HOSTED BY THE CENTER FOR
ADVANCED STUDY IN EDUCATION
Institute for Research & Development
in Occupational Education

This project is funded by a grant from the
New York State Education Department.
VEA NO. 152-89-5143

87

Dr. S.M. BRODSKY
CASE/CUNY GSUC
25 WEST 43RD STREET
ROOM 620
NEW YORK, NY 10036

APPENDIX I

FOLLOW-UP PROGRAMS, PROJECTS & ACTIVITIES

As Reported By Participants

FOLLOW-UP PROGRAMS, PROJECTS & ACTIVITIES

As Reported By Participants

Introduction

The programs, projects and activities mentioned in this section include new initiatives resulting from these conferences/workshops, ongoing activities which have been enhanced as a result of these conferences/workshops, and relevant activities of interest which are independent of the conferences/workshops. Several items of interest are also included from the presentations of conference speakers.

Faculty Training Activities

Several participants reported that they had planned or conducted conferences, workshops or training programs for counselors and faculty on topics relating to this project. Four such specific reported activities were as follows.

"Women in Engineering" workshop in conjunction with Women's History Month included presentations by Prof. C. A. Fazzolari and Dr. M. B. Carlin during the one hour session attended by 6 counselors, 6 faculty and 4 students. [P. Luk, New York City Technical College]

"Women in Science & Technology" conference with presentations by 4 female faculty from areas of mathematics, computer technology, physics, and medical laboratory during a two hour period. Attended by a mixed audience of 40 faculty and students. [P. Luk, New York City Technical College]

A series of professional development seminars for faculty on topics dealing with women and minorities were conducted. [D. Patrick, Suffolk County Community College]

Counselors and faculty advisors who were selected to support activities of the Student Development Center were trained using a variety of materials including some from the American College Testing Program (ACT) and the National Academic Advising Association. [F. Campone, New York City Technical College]

Recruitment Activities

The City University of New York has funded 1989 Pre-Freshmen Summer Basic Skills Programs on 17 senior and community college campuses at a cost of $2.3 million involving 7000 students and hundreds of faculty. Institutions have individualized these programs under different names and with emphases to meet local needs. All of the CUNY colleges represented at the conference/workshop had such a program in operation during 1988 and planned for 1989. Two examples of unique names for such programs are given below.

Pre-Freshman Immersion Program [L. Minnite, Borough of Manhattan Community College]

Headstart To College [D. Call, Queensborough Community College]*

All colleges represented also conducted STEP programs funded by the New York State Education Department which focus on encouraging high school and junior high school students to prepare for and work toward scientific, technological, or engineering college programs. Two specific examples are given below.

Recruitment Activities (Cont'd)

STEP program with additional funding from the MacArthur Foundation includes 100 high school juniors covering a summer plus one academic year which includes mathematics enrichment, science laboratory activities, Stanley Kaplan's SAT course, a summer sports camp job with a one week training workshop, counseling, mentoring, and a Bridge Program to Bronx Community College. [L. Squitieri, Bronx Community College]

STEP program involves 247 junior high school students in introductory science, mathematics and technology. [D. Patrick, Suffolk County Community College]

Several colleges reported having Bridge Programs whereby high school students, usually in 11th or 12th grades are permitted to take college courses on a seats-available basis with tuition usually being waived and the credits earned being banked pending future enrollment.

Additional specific activities which were reported are given below.

Participation of college faculty as mentors and judges in high school science fairs may be a useful recruiting technique. In addition, visitations to grade schools and junior high schools to discuss careers and serve as role models might help youngsters continue their work in math and science. [B. Magid, Suffolk County Community College]

An eight week summer evening program for high school minority students introduced 40 students to science and technology. [D. Patrick, Suffolk County Community College]

A nine hour program to impart Academic Survival Knowledge was conducted in high schools for motivation and for students who were undecided about going to college. [D. Patrick, Suffolk County Community College]

A special tuition-free certificate program which is specifically targeted to women and minorities in Professional Video Training, PROVIT, is funded by the film industry in New York City. [B. Perkins, Borough of Manhattan Community College]

A Career Day at a high school where faculty and minority professionals working in the field explain to students what particular careers involve. [D. Hairston, LaGuardia Community College]*

An "Adopt-A-School" program whereby companies provide scholarship funds to support average minority high school students who would not attract other scholarships to reinforce the importance of their attending college and to ensure their financial ability to do so. [D. Hairston, LaGuardia Community College]*

Speaking programs to youth at churches in the minority communities. [D. Hairston, LaGuardia Community College]*

Comprehensive program for recruiting women into engineering and technology involving high school populations and adult women returning to college. [C. Fazzolari & M. Carlin]*

Retention Activities

Several colleges have state-funded CSTEP programs which provide activities for women and minority college students in science and technology. A specific example of one such program is given below.

A series of CSTEP motivational workshops are being given for 64 women and minority students in science, health and technology

curricula. [D. Patrick, Suffolk County Community College]

Special programs for freshman students are offered in many of the colleges. Some examples are given below.

A Student Development Center (SDC) has been established to focus on special populations of freshmen with expectations that an integrated Freshman Year Experience will evolve. The SDC features a coordinated freshman advisement and counseling process with teams of counselors and departmental faculty who have been trained for this purpose. Additional retention-oriented activities conducted through the SDC include an expanded CUNY BA/BS program, the college's Bridge Programs, and a newly enhanced file of retention literature, some of which is from the conference/workshop take-home materials [F. Campone, New York City Technical College]

A new course has been developed to help freshmen make the academic, personal and social adjustments for successful participation in college. The course, AA 101 Academic Access, meets 1.5 hours per week but awards no credit. It is taught jointly by a counselor-faculty team. The content includes improvement of learning skills, such as time management, goal setting, communication skills, study skills and test taking, in addition to awareness of available resources, exploration of interests and abilities, and a cultural exposure program. [M. Waxman, New York City Technical College]

Counselors are being assigned to a group of departments within a single division so that they may work more closely with the same faculty and student bodies. In fall semesters they monitor the incoming freshman class to anticipate and avoid problems and identify and work with at risk students. In spring semesters they concentrate on probationary students and through counseling and departmental faculty support attempt to have the students remove themselves from probation. [A. Lawrence, New York City Technical College]

A peer program offered through the College Library has "master" students giving seminars to freshmen for motivation and academic survival. [D. Patrick, Suffolk County Community College]

Additional retention activities which were reported are given below.

A college-wide Retention Committee is at work drafting proposals for the College Senate. It was noted that the conference/workshop take-home materials were useful to the Retention Committee. [R. Lopez, Hostos Community College]

A program entitled Research Enrichment Activities Program (REAP) for minorities is funded by the NIH. Ten students, mostly in science programs become part of the Minority Bio-Medical Research Society (MBRS) and receive special opportunities to learn skills in research in outside laboratories, publish papers, do literature searches, and on-campus pre-research experiences. [L. Squitieri, Bronx Community College]

An enhanced follow-up process for students with incomplete grades has been implemented, including personal letters and expedited make-up examinations and grade change processing. More than one-third of the students with incompletes responded and cleared their records -- a much higher proportion than would have occurred otherwise. [H. Tyson, Bronx Community College]

As an outcome of a conversation with Dr. Wilson at the workshop, has initiated the use of single concept examinations to

Retention Activities (Cont'd)

reduce test anxiety and increase mastery. [H. Tyson, Bronx Community College]

After the lecture in multi-hour design or drafting sessions, upper class paid interns do one-to-one peer tutoring in the classroom. [P. Sperling, New York City Technical College]

Showing trust and personal interest in students tends to support retention. The faculty member administers a personal low-key teacher to student loan system (up to $50) for books and supplies and reports no defaults. Also when other non-academic problems occur, the faculty member take the student personally to a counselor and introduces them and later expects feedback on whether the problem has been resolved. [P. Sperling, New York City Technical College]

A number of key elements in a successful retention program were identified as including the importance of Presidential leadership; the need for increasing numbers of minority faculty in the sciences, mathematics and technical departments; the effort needs to be comprehensive and include environmental and atmospheric factors; a system of accountability possibly including rewards and incentives; a system of evaluation including student scores at entry and exit, retention rates, relative recruitment success of faculty and students from various sources; and early identification of high risk students and their problems. Additional factors which support retention include non-voluntary remedial courses when needed; mandatory periodic counseling and mentoring; continuous assessment and diagnosis of student performance; assignment of the better faculty to teach preparatory courses; and an institutional commitment to the belief that women and minority students can succeed. [R. Wilson, American Council on Education]*

Five important components which influence retention were specified as including a realistic and well-informed recruitment program with accurate information; awareness of the profile of the freshmen who attend; placement testing program and results available to counselors and faculty advisors and appropriate remedial and support courses; continued support for students taking content courses including peer mentoring; and trained advisement teams of counselors and faculty focusing on specific populations such as remedial students, readmitted students, international students, part-time students, and disabled students. [E. Nunez-Wormack, College of Staten Island]*

* Identifies items included as formal presentations. For further information, see the summary of the author's remarks in Appendix A or E.

APPENDIX J

EVALUATION SUMMARIES

RECRUITMENT CONFERENCE/WORKSHOP -- EVALUATION COMMENTS (N = 20)

The evaluation instrument used in the Recruitment Conference/Workshop requested "frank impressions, evaluations, critique, suggestions for improvements, etc." for the major portions of the program as well as an overall evaluation.

Item 4. Overall Evaluation:

1.* The workshop was motivational. It is always good to share ideas or obtain information from people with similar interests.
2. AM was interesting, especially when approaching real, specific recruitment and program ideas that could be utilized.
3. Very fine program -- both presenters and format.
4. Very motivating & informative, however lack of focus between recruitment/retention and technology/professional careers caused wandering rather than concentration on specific issues.
5. Artificial distinction between recruitment and retention necessitated some floundering to establish direction. Minor complaint.
6. Excellent. However, there is a need for a continued follow-up, by mail, by a further meeting, by a questionnaire, etc.
7. Helpful in focusing a major problem in higher education.
8. Paced well -- could use more free flow of ideas between participants.
9. Enjoyed the conference immensely.
10. Too little opportunity for discussion & cross-fertilization.
11. Excellent.
12. Excellent.
13. Good.
14. Was very good. Gained positive feedback from others & insight gained in what I can do to get others to help in retention.
15. Well done.
16. This was a practical workshop where not only the specific issue of associate degree in engineering was covered but also broader educational implications which can impinge on program development.
17. I found it quite illuminating & the perfect introduction to this area of recruiting.
18. Good work.
19. Excellent workshop.
20. Very good.

Item 1. Keynote Address & Materials:

1.* Material not new but reinforces my commitment to this area.
2. Reiteration of what I have heard and read -- not new material.
3. I came late but what I heard was clear and informative.
5. Very good and very useful.
6. Excellent.
7. Interesting and central to current educational concerns.

---

* Each number represents a specific individual's response. For example, responses to all items with number 1 were from the same person. A missing number means the person skipped that item.

Item 1. Keynote Address & Materials (Cont'd):

8. Good -- too much data.
9. Satisfactory. An interesting beginning which stimulated ideas & approach.
10. Interesting data, but of uncertain application to a university in the throes of a budget crisis.
11. Very interesting.
12. I arrived a little late but what I gathered from the speaker was quite helpful. Excellent.
15. Informative.
16. Very insightful and useful. Set an appropriate tone for workshop.
17. Excellent.
18. Well done -- I was not expecting such an interesting presentation of statistics.
19. Was excellent. I would like to hear more from her.
20. Excellent -- informative. Up-to-date data.

Item 2. Panel Presentations & Materials:

1. Statistical data interesting. Involved in some of the same kinds of programs.
2. Staten Island program very interesting and well done. Also recruitment as described by D. Hairston was informative and refreshing. Third presentation was confusing. Its message seemed to be "we have recruited women and minorities -- CUNY doesn't have to worry" but there was a real discrepancy here! There is a problem -- recruiting women into engineering.
3. Excellent report on the COSI project and the LaGuardia and research reports were stimulating and provocative.
4. A nice blend of presentations. More time for discussion & questions would be of advantage. Materials were very adequate and made it easier to follow presentations.
5. Provocative. Good for defining issues. Good choice of presenters.
6. Excellent. Hand out materials excellent. Speakers great. Questions excellent at first but too lengthy later.
7. Presentations and materials offered new insights and strategies for recruitment. Stimulating to learn about existing successful projects. Excellent materials!
8. All excellent. Very down to earth. Good ideas.
9. Too short. Questions I needed to ask remained unanswered.
10. Jefferson's discussion of CUNY & its problems was very incisive. The projects outlined by Cooke & people from COSI were of limited significance. Their presentations were anecdotal, and it was unclear how the programs could be generalized. Hairston was excellent for her enthusiasm & imagination.
11. Recruitment presentation, in particular, was most revealing. Involvement of churches as a strategy of involvement and retention of students should be followed up by other institutions.
12. Excellent. I would like to have spent more time with Dean Jefferson & Dr. Lloyd Cooke on recruitment and retention.
14. Dr. Cooke's & Deborah Hairston's presentations were great.

Item 2. Panel Presentations & Materials (Cont'd):

15. Very interesting & informative. Needed more time for questions & discussion.
16. Very good. Appreciate materials on Staten Island program & CUNY data.
17. Excellent. The variety gave me a well rounded view of the area of minority recruitment and left us ready to talk further about retention.
18. The panel was well balanced with a wide variety of people in the field.
19. I felt the panel gave a lot of ideas and approaches to recruiting minorities.
20. Panel presentation raised discussion well-related to main objectives, e.g. improved recruitment. It became clear that retention was equally important to goals of women and minority participation.

Item 3. Small Group Sessions & Materials:

1. Interesting material and ideas were shared.
2. Not productive for me -- just a re-discussion of the AM.
3. Gave a chance to have more specific discussion & ask questions that had been generated earlier.
4. Provided a relaxing way to exchange information -- lots of good suggestions & concepts were talked about.
5. Good for following through on the issues defined. Lunch was good for this as well.
6. Excellent. Very interesting.
7. An excellent opportunity to learn about problems and programs in other community colleges & in generating new ideas. Inadequate time for discussion!
8. Good. A bit unfocused.
9. The sharing of practices discussed which resulted in realistic uses was being raised for individuals to address back at the work place. Super. Good and positive contributions made by everyone. Time constraint.
10. Much too short. In general, I learned more from the other participants than from the panelists.
11. Discussion group aired possibilities for curriculum changes. Need to set realistic goals and guidelines to implement them on a wide scale.
13. Insufficient time to discuss topics raised by group members.
15. Since the conference was so small it was not necessary to spend much time in small groups. I would prefer for the extra time to be used by the panel.
16. Focused & leader was most helpful in offering suggestions & references.
17. The small group sessions gave me a chance to take a closer look at the College of Staten Island's program. I enjoyed their tape.
18. The small group sessions needed to be longer -- I understand the constraints that made that impossible today.
19. They were very informative. Needed more time.
20. I enjoyed it, but we could have used a little more time.

RETENTION CONFERENCE/WORKSHOP -- EVALUATIONS (N=26)

The evaluation instrument used in the Retention Conference/Workshop requested evaluation of the major portions of the program as well as an overall evaluation on a four point scale. Space for additional written comments was provided for each item.

Item	Responses	Excellent	Good	Adequate	Poor
7. What is your overall rating of the conference/workshop?	24	16	8		
1. How would you rate the refreshments and workshop luncheon arrangements?	25	12	11	2	
2. How would you rate the keynote presentation?	24	20	4		
3. How would you rate the panel presentations?					
3A. "Retaining Students & Maintaining Standards"	26	17	9		
3B. "The Chilly Classroom Climate"	26	15	10	1	
3C. "Headstart to College"	25	9	11	5	
3D. "Highlights of the Last 18 Years"	19	5	12	2	
4. How would you rate the video session?	21	3	17	1	
5. How would you rate the small group discussion sessions?	21	9	10	2	

	Yes	No	Uncertain
6. Do you plan to initiate a project or enhance an existing effort as a result of this conference/workshop?	21	8	13

RETENTION CONFERENCE/WORKSHOP -- EVALUATION COMMENTS

Item 7: What is your overall rating of the conference/workshop?

I really enjoyed the conference/workshop. I plan to have a couple of workshops at my college in the near future on "How To Study" & "Retention Span". Please have more conferences of this type.

Interesting to meet with other professionals to discuss issues of concern.

Even more concrete suggestions are needed!

These types of conferences should be held more often. However, more experts in the fields of science & engineering should be invited, particularly minority and/or female.

Really enjoyed the opportunity of talking to all the presenters, lunch small groups, as well as the presentations. Well organized conference & well chosen presenters. The "handouts" provide material I need very much.

Item 2: How would you rate the keynote presentation?

The issues were well thought out and presented in such a manner that we all were able to relate to & take part in the discussion.

Dr. Wilson was insightful, thorough and well prepared.

I hate statistics. The last 10 minutes were very valuable.

Dr. Wilson was a wonderful speaker and his presentation was very informative.

Item 3: How would you rate the panel presentations?

I thought that the materials presented & given out was of interest and very helpful to me. Since I am a minority & work in a predominately minority college, I can use a lot of these materials & sources.

I wasn't able to sit with the presenter to continue the questioning.

Great.

Item 4: How would you rate the video session?

Needs to address cultural dissonance and denied identity beyond the "academy" that is an inescapable part of the "academy".

Item 5: How would you rate the small group discussion sessions?

The Call & Hennessy small group lacked focus.

Item 6: Do you plan to initiate a project or enhance an existing effort as a result of this conference/workshop?

Plan to contact all female engineering students via phone.

Involved in a 10 year planning process.

I plan to have a couple of workshops at my college.

Need to process all the information. I'm sure much of it will be very useful.